STEEL
The Metalworking Weekly
A PENTON PUBLICATION
NOVEMBER 13, 1961

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THE NEW "A" BORE-MATICS

Completely new machine design from base to bridges for versatility, capacity and ease of maintenance.

by Albert A. Arbogast

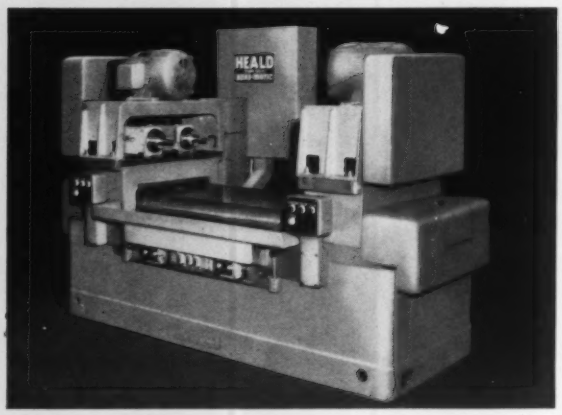
Manager, Bore-Matic Machine Division
The Heald Machine Company

What is the basic philosophy behind the new "A" series line of Bore-Matics? That's a good question—and a simple one to answer because the basic motivating factor was "simplicity" itself. For In almost every case the basic new design feature in this new Bore-Matic line makes them *easier* to set up, *easier* to change over, *easier* to operate and *easier* on service inspection. All this has been accomplished while still maintaining our continual trend toward higher standards of accuracy and precision.

Take the new machine bridges, for example. Within a given size of machine, bridges are removable and interchangeable. Furthermore if a user has a single-end version of a new "A" Bore-Matic he can readily convert it to a double-end unit by adding a second bridge, boringheads, drive, and associated cycle and hydraulic equipment.

Bridge pads and tee slots are provided at both ends of all machines in each of three size ranges. Bridge setback is infinitely adjustable within its range, too—permitting wider latitude for tooling and fixture design and minimum rapid traverse time. New bridge location has also substantially increased the workholding capacity of these standard machines.

Manifold hydraulic transfer plates and valves that used to be inside the base cavity are now mounted externally on a separate panel at the rear where they are more easily accessible—such a location also isolates a heat source from the machine base contributing to uniform precision throughout longest production runs.



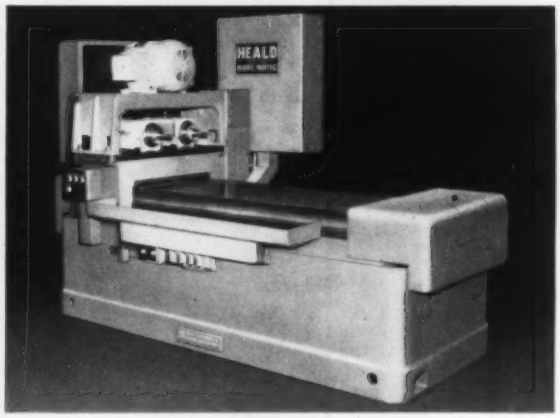
The hydraulic power unit has also been located separately from the base at the rear of the machine, for ease of access and elimination of thermal distortion.

The machine table is larger, heavier and travels on hardened and ground box type ways with hold downs—such construction assures maximum accuracy of table travel.

The new model Bore-Matics are now available in three basic "A" machine sizes—2, 3 & 4—each of which can be furnished as either single or double end machines.

Capacities of the new "A" series Bore-Matics are shown in the following table:

	222A	322A	422A
Width of Bridge	31"	34"	38"
Distance between Bridges (adj.)	16"-36"	24"-43"	30"-54"
Table travel	15" or 18"	20"	25"
Table Pad Dimension	14" x 55"	18" x 64"	24" x 80"



Above, Model 424A, single end version of the size 4 type Bore-Matic; bridge, heads, drive equipment, etc. on left end only.

At left, 422A, double end version of the size 4 type Bore-Matic; bridges, heads, drive equipment, etc. on both ends of machine.

It Pays to come to Heald

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.
Worcester 6, Massachusetts

Bethlehem special bar section helps capture design award for copper-headed steel conductor rail

This year's top industrial award in the annual Copper and Brass Research Association achievement competition went to this copper-headed steel conductor rail. Manufactured by Ringsdorff Carbon Corporation, East McKeesport, Pa., the rail combines the conductivity of copper with the strength of steel. The result is a compact, low-maintenance product, ideal for use on fixed-track, materials-handling equipment.

Steel

for Strength
. . . Economy
. . . Versatility

STEEL "T" SECTION COPPERHEADED BY UNIQUE PROCESS

To produce the rail, Ringsdorff draws the two components—the extruded-copper "head" and the hot-rolled Bethlehem carbon steel "T" section—through a die which compresses the copper flanges around the bulbed end of the tee, as well as around the diamond-shaped "ribs" rolled into each side of the steel. These ribs are an essential feature of the hot-rolled bar, as they serve to unify the thermal expansion of the two metals: since the copper head is free to move along the steel tee only between two adjacent ribs, the effect of their different expansion rates cannot become cumulative along the 30-ft length of the rail.

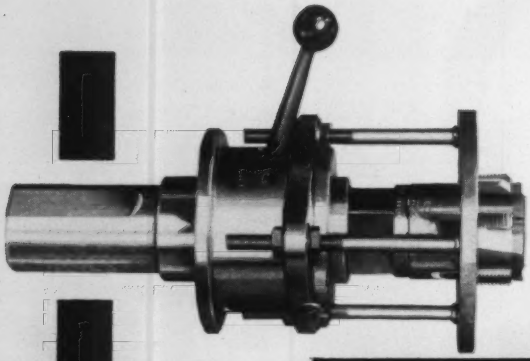
GET DESIGN FREEDOM WITH SPECIAL BAR SECTIONS

Let Bethlehem quote on the shape you need in a hot-rolled steel bar. We've rolled hundreds of different carbon and alloy sections, each one to a customer's individual specifications. Thousands more "undiscovered" sections are practical. Our design experts are at your service—just call any Bethlehem office.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa. *Export Sales:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

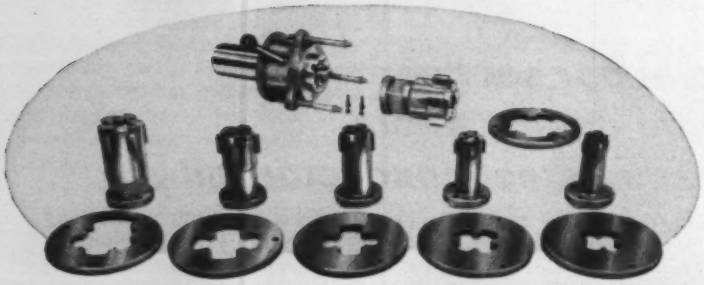
BETHLEHEM STEEL



ALT Taps for Straight Threads

LANDIS ALT Collapsible Taps are available for producing straight threads from 1¼" to 13¼" in diameter. These taps feature a rugged construction and design simplicity which enable maximum chaser rigidity, and the same tap may be used for either stationary (shown) or rotary application.

The basic design of all LANDIS Tap Heads assure maximum bearing support between the chaser, plunger and tap head body. Heavy metal sections provide rigidity to the chasers and plunger, particularly at the points where cutting strains are transmitted.



Wide Range Coverage

Detachable heads are a feature of all LANDIS Collapsible Taps. This design allows tapping a wide range of thread diameters with minimum tooling—for example, the 3ALT body using 6 different heads will tap all diameters from 1¼" to 3¼". Each tap head itself has a wide threading range—the 1½" head will thread from 1⅜" to 1⅝", the 2" from 1⅞" to 2 5/16", the 3" from 2¾" to 3¼".

LANDIS *Machine* COMPANY

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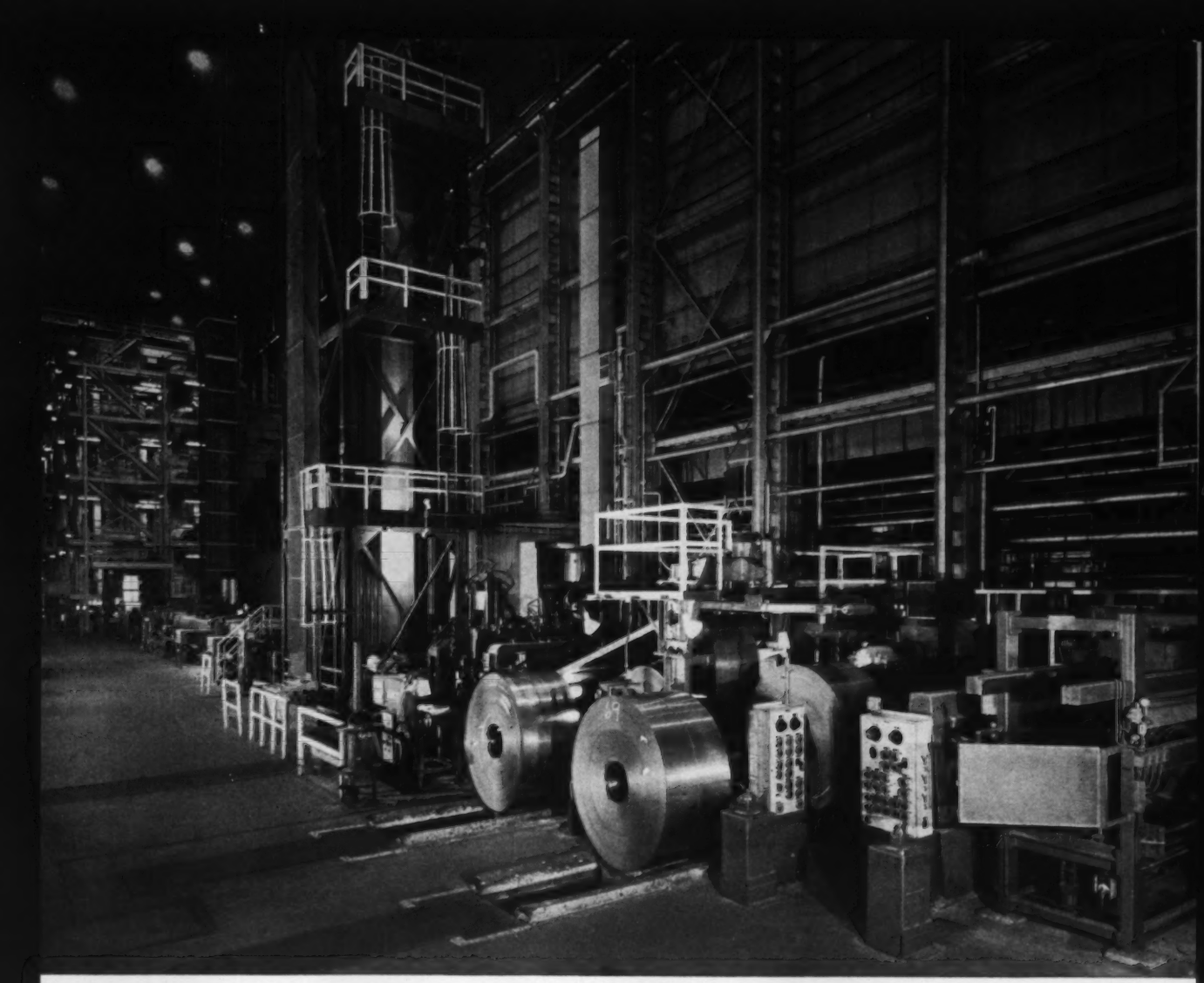
431



New Wean Continuous Annealing Line increases Inland's tin plate capacity

Recently installed at Inland Steel Company's Indiana Harbor Plant, this new Wean continuous annealing line was added in an expansion of the company's high quality tin plate production. Designed to operate at speeds up to 1250 fpm, the No. 2 line can handle 48,000 lb. coils, with a maximum O. D. of 73" and a maximum strip width of 44".

Heavy-end reject material is welded and recoiled on a scrap reel at the entry end. Constant preset tension and accurate tracking of the strip are maintained throughout the line by five precision bridles. A TV monitor checks strip tracking within the furnace section.

Whether your planning includes modernization of existing processing facilities or installation of new equipment, Wean will be able to assist you. Wean's 32-year partnership with the steel industry has resulted in unparalleled experience in the design and construction of strip and sheet processing facilities. Wean's "Creative Engineering" is ready to work for you.

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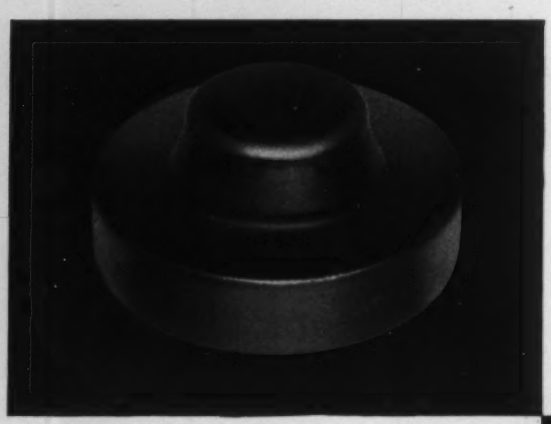

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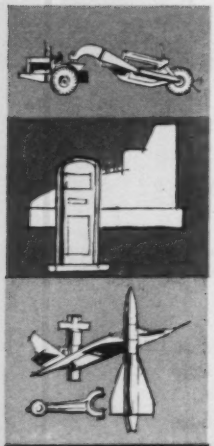
T & W TECHNIQUE

to reduce cost . . .
improve quality



T & W was able to save one manufacturer 54% on the total overall cost of his part. This and many more such examples are the end result of T & W applying a modern concept of ideas and experience which is helping manufacturers in a wide range of industries to *reduce parts cost and improve quality.*

Let T & W try to do the same for you. *Just call or write—or send us a print.*

in forgings

Sizes: 1 ounce to 500 pounds.

Materials: Carbon and Alloy Steel, Non Ferrous and Stainless, Titanium, Pure Molybdenum, and High Temperature Alloys (Plain or Heat Treated).

IT'S BETTER FORGED

in stampings

Sizes: 3 inches by 3 inches, to 60 inches long, 40 inches wide and 16 inches in drawn depth.

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New Feature

In case you missed its introduction on Oct. 9, p. 78, we'd like to call your attention to a new feature, "The Trader's Horn," which will appear monthly—it's on Page 121 in this issue. Topics bearing upon export trade and direct foreign investment are discussed with authority.

The author is Steve Rundt, who heads S. J. Rundt & Associates, New York management consultant on international business. After serving his apprenticeship in foreign banking in Switzerland, Mr. Rundt broadened his scope considerably by working with large companies in Europe, Canada, and the U. S. He added another facet to his knowledge as a U. S. intelligence officer before, during, and after World War II. From 1946 to 1952, he was chief of counterespionage at Gen. Mark Clark's headquarters. Toting up that experience, we get the profile of an unusual man: Steve Rundt, world trader, economist, market analyst, financial adviser to businesses here and abroad, political analyst, and linguist.

Incidental Intelligence

Item: In 1961, more than 2.5 trillion checks will be processed by the U. S. banking system.

Item: Law enforcement officers in Toronto Township, Ontario, are using airplanes to see if scrapyards and other industrial operations are in violation of zoning restrictions.

Restaurant Week

Now that the convention season is in full swing, many of you have been or will be traveling a good deal. Have you run into any unusual restaurants that might interest others next time they're in Podunk for the annual meeting of the National Association of Metalworking Managers?

Associate Editor Don Postma offers suggestion No. 1, the Stockholm Restaurant on East Jefferson in Detroit, about a 5 minute cab ride from the hotel district. It's the home of the Swedish Engineering Institute of Detroit and specializes in a true, multicourse smorgasbord.

Team Effort

Ten editors had a hand in the story on steel service centers which appears on Page 213. Market Editor Bill Rooney was in charge and wrote the piece, but he had help in gathering information from Associate Editors Ben Price, L. E. Browne, and Reed Trask in the East, Bill Wallace in Pittsburgh, Erle Ross in Chicago, and Don Postma in Detroit.

Associate Managing Editor Vance Bell edited the job. It was copyread by Copy Editor Harry Chandler and rechecked by Associate Copy Editor Glenn Dietrich.

Much of the material in STEEL is prepared by a team of editors. That's why we seldom use bylines.

Nuclear Runabout

Cars a century or so from now may be called "Atom-obiles."

Scientists predict that we'll run out of petroleum products in about another hundred years, and gasoline engines will become extinct.

Dr. Bertram Keilin, head of the Foundational Research Department of Aerojet-General Corp.'s Chemical Div., suggests that atomic energy will power the cars of the future when oil is exhausted. He says a piece of uranium or other nuclear fuel the size of a baseball would be used as a source of heat to power the car.

But, Dr. Keilin points out, the sources of readily available nuclear fuels would also become exhausted—probably in less than 50 years. At that point, he envisions huge coastal chemical plants to extract nuclear fuels, plus all other materials, from the earth and the sea.

Puzzle Corner

First in with the correct answer of 15 to our Oct. 30 puzzle were: W. J. Burr of Toledo Scale Corp.; William J. Regan III of Pittsburgh Steel Co.; E. R. Anderson of Glencoe, Ill.; C. G. Lohmann of Hart & Cooley Mfg. Co.; and William J. Slattery of Hanson-Van Winkle-Munning Co.

Here's an excursion into metaphysical math: If one-third of six were three, what would one-fourth of 20 be?

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Fluid Power NEWS

OILGEAR 40 Years of Fluid Power

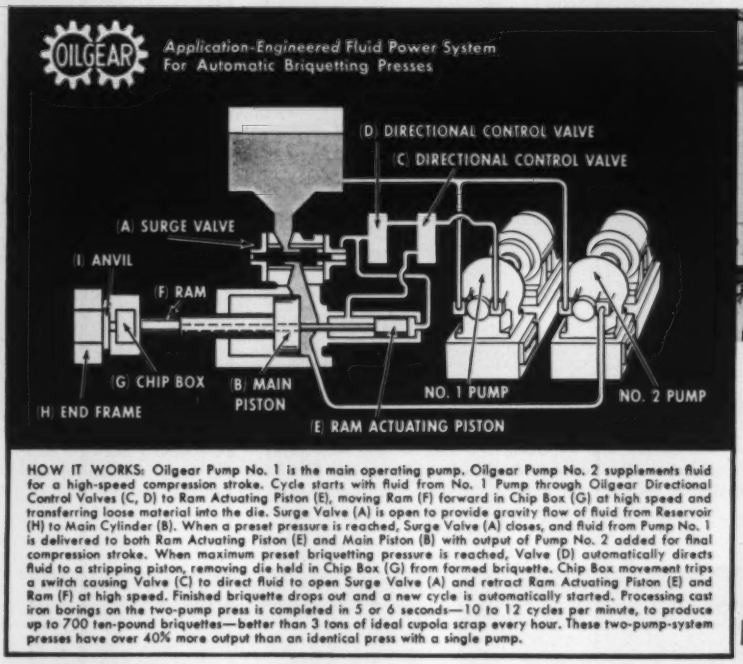
From Oilgear *Application-Engineering* Files

HOW OILGEAR-EQUIPPED BRIQUETTING PRESSES PRODUCE MORE—LONGER—AUTOMATICALLY

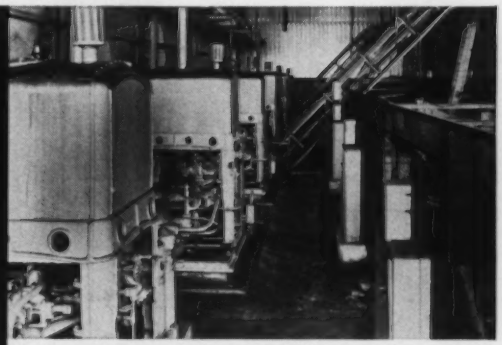
CUSTOMER: *Milwaukee Foundry Equipment Division of SPO Inc.*

DATA: To power a line of presses specially designed for low cost, rapid conversion of bulky, low-grade metal turnings and borings into dense, uniform-sized briquettes to: conserve storage space; simplify handling; prevent storage oxidation—particularly with finely divided metals or sponge iron; provide sufficient density and size to melt rather than flash into oxide on entry into foundry cupola; control metal content; provide a simple means of accurate compounding for alloying or supplying a flux.

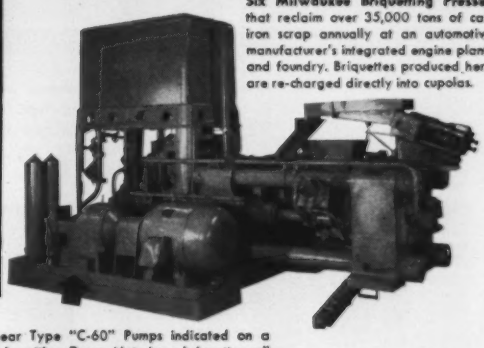
PRESS SYSTEM REQUIREMENTS: 1. Eliminate wear and maintenance costs resulting from use of gears and bearings. 2. To be controlled hydraulically, electrically, or electrohydraulically for automatic cycling at rates ranging from 9 to 17 strokes per minute. 3. Sufficient force to provide briquette densities of 70 to 80% with conservative pump loading. 4. Long life, rugged dependability . . . capable of years of continuous operation with an absolute minimum of maintenance.



HOW IT WORKS: Oilgear Pump No. 1 is the main operating pump. Oilgear Pump No. 2 supplements fluid for a high-speed compression stroke. Cycle starts with fluid from No. 1 Pump through Oilgear Directional Control Valves (C, D) to Ram Actuating Piston (E), moving Ram (F) forward in Chip Box (G) at high speed and transferring loose material into the die. Surge Valve (A) is open to provide gravity flow of fluid from Reservoir (H) to Main Cylinder (B). When a preset pressure is reached, Surge Valve (A) closes, and fluid from Pump No. 1 is delivered to both Ram Actuating Piston (E) and Main Piston (B) with output of Pump No. 2 added for final compression stroke. When maximum preset briquetting pressure is reached, Valve (D) automatically directs fluid to a stripping piston, removing die held in Chip Box (G) from formed briquette. Chip Box movement trips a switch causing Valve (C) to direct fluid to open Surge Valve (A) and retract Ram Actuating Piston (E) and Ram (F) at high speed. Finished briquette drops out and a new cycle is automatically started. Processing cast iron borings on the two-pump press is completed in 5 or 6 seconds—10 to 12 cycles per minute, to produce up to 700 ten-pound briquettes—better than 3 tons of ideal cupola scrap every hour. These two-pump-system presses have over 40% more output than an identical press with a single pump.



Six Milwaukee Briquetting Presses that reclaim over 35,000 tons of cast iron scrap annually at an automotive manufacturer's integrated engine plants and foundry. Briquettes produced here are re-charged directly into cupolas.



One of the two Oilgear Type "C-60" Pumps indicated on a 350-ton **Milwaukee Briquetting Press.** Note how briquettes roll out of the press to be picked up by magnets.

SOLUTION: Oilgear *Application-Engineered* systems consisting of Oilgear Type "C" Heavy-Duty Constant Displacement Radial Rolling Piston Pumps and Directional Control Valves. Pump requirements range from 23 gpm on the 75-ton Presses to 325 gpm on new 1000-ton presses. *Milwaukee Foundry Equipment*—builder of over 80% of all briquetting presses, and an exclusive user of Oilgear Fluid Power Systems since 1927—recently reported: "*We just modernized a press that had been in continuous cast iron briquetting operation for over 18 years . . . there had been no reported major maintenance . . . the Oilgear components still operated fine—with no appreciable signs of wear or loss in efficiency.*"

This is just one evidence—out of hundreds—of the long service life of Oilgear Systems. Ten or more years of continuous service is common with Oilgear equipment, rather than the exception . . . with many of these systems operating under adverse conditions—rapid cycling, grit-laden air, heat, and extreme humidity. Where the going is toughest—Oilgear Pumps just keep rolling along . . . quietly, efficiently.

With Oilgear Heavy-Duty System Components designed for thousands of hours of continuous service at full rated load, savings are compounded with every hour of uninterrupted performance. That's why machinery and equipment manufacturers and *their* customers say . . .

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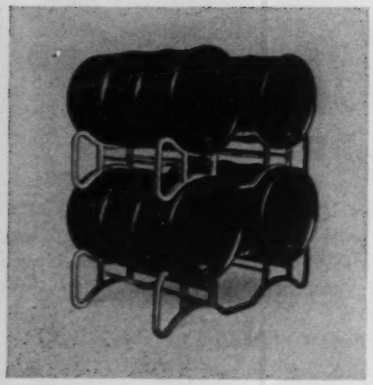
Apex worked closely with Republic, and Thornel and Associates in determining the best box design for their job. The Republic Drop Bottom Boxes are 54″ wide, 62″ long, and 45″ deep. Made of highest quality steel, with reinforced corrugated design for rugged, long-life service.



NEWEST IDEA for storing drums—strong, low-cost Republic Portable Drum Racks. Of all-steel channel construction, the racks assemble quickly and save valuable floor space. Available for immediate delivery. Mail the attached coupon for more information.

MEASURE, CUT, ASSEMBLE. That quick, with Republic METAL LUMBER® you have stronger, safer framing for any application where common building materials are now being used. Comes in two gages, two widths, standard bundles of 10- or 12-foot lengths. Send coupon.

CONTRACT MANUFACTURING SPECIALISTS. From design through engineering and fabrication, rely on Republic for contract production of sheet metal products. Wide range of facilities means that Republic can handle your complete job (or any phase of it) . . . often at considerable savings. Send for information.

Apex mechanizes material handling with Republic Drop Bottom Boxes...

OPERATING ECONOMIES TO PAY FOR NEW EQUIPMENT WITHIN 2½ YEARS

From scrap receiving to melting furnaces, Apex Smelting Company, Chicago, has mechanized and streamlined operations with 900 new Republic Drop Bottom Steel Boxes. Here is modern containerization in action—eliminating manual handling; stopping scrap material loss; facilitating an accurate records system; and *saving dollars every step of the way.*

According to Mr. P. R. Janney, Apex project engineer, operating economies resulting from the use of Republic Drop Bottom Boxes will pay for the new equipment over a short, easily amortized period of from 2 to 2½ years.

Apex buys scrap metals, which are sorted, prepared, stored, and finally melted down and poured into pigs of specification aluminum alloy for resale. Formerly scrap was transported to the sorting equipment in a variety of temporary containers — drums, wood cartons, burlap bags. After sorting, it was stored in bins, then hand and power shoveled into containers to go to the melters.

Now scrap is mechanically loaded into Republic Drop Bottom Boxes at the receiving dock, carried to the sorter by fork trucks, sorted, prepared, and reloaded into the same boxes. Card pockets on each box speed identification of its contents for charging into melters.

WHATEVER YOUR MATERIAL HANDLING OR CONTAINERIZATION PROBLEM, Republic's Material Handling Engineers can help you solve it. Republic equipment is engineered and built to your specific job requirements. Send the coupon for more information.

REPUBLIC STEEL

Republic Has The Feel For Modern Steel

Strong, Modern, Dependable

REPUBLIC STEEL CORPORATION
DEPT. ST-1962
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following:

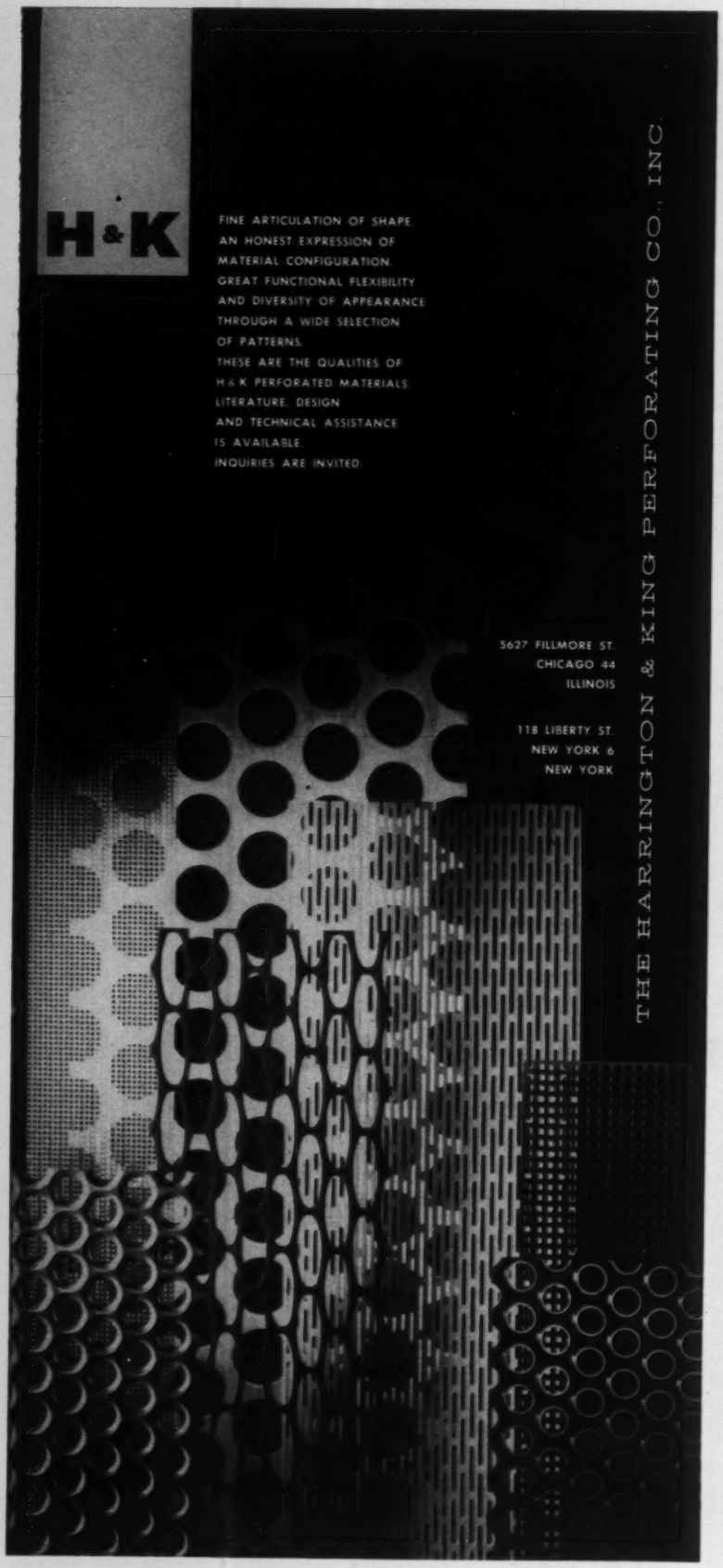
☐ Republic Material Handling Units ☐ Contract Facilities
☐ METAL LUMBER® ☐ Drum Racks

Name_____ Title_____

Firm_____

Address_____

City_____ Zone_____ State_____



CALENDAR
OF MEETINGS

Nov. 15-17, Drop Forging Association: Winter meeting and divisional conferferences, Sheraton-Blackstone Hotel, Chicago. Association's address: 55 Public Square, Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

Nov. 15-17, National Foundry Association: Annual meeting, Savoy Hilton Hotel, New York. Association's address: 4321 St. Charles Rd., Bellwood, Ill. Executive secretary: C. T. Sheehan.

Nov. 15-18, National Association of Aluminum Distributors: Annual convention, Arizona-Biltmore Hotel, Phoenix, Ariz. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: R. Bruce Wall.

Nov. 16, National Electrical Manufacturers Association: Annual meeting, Plaza Hotel, New York. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: J. F. Miller.

Nov. 21, Manufacturing Chemists' Association Inc.: Semiannual meeting and conference, Commodore Hotel, New York. Association's address: 1825 Connecticut Ave. N.W., Washington 9, D. C. Executive secretary: Maurice Crass Jr.

Nov. 26-Dec. 1, American Society of Mechanical Engineers: Winter annual meeting, Statler Hilton Hotel, New York. Society's address: 345 E. 47th St., New York, N. Y. Secretary: O. B. Schier.

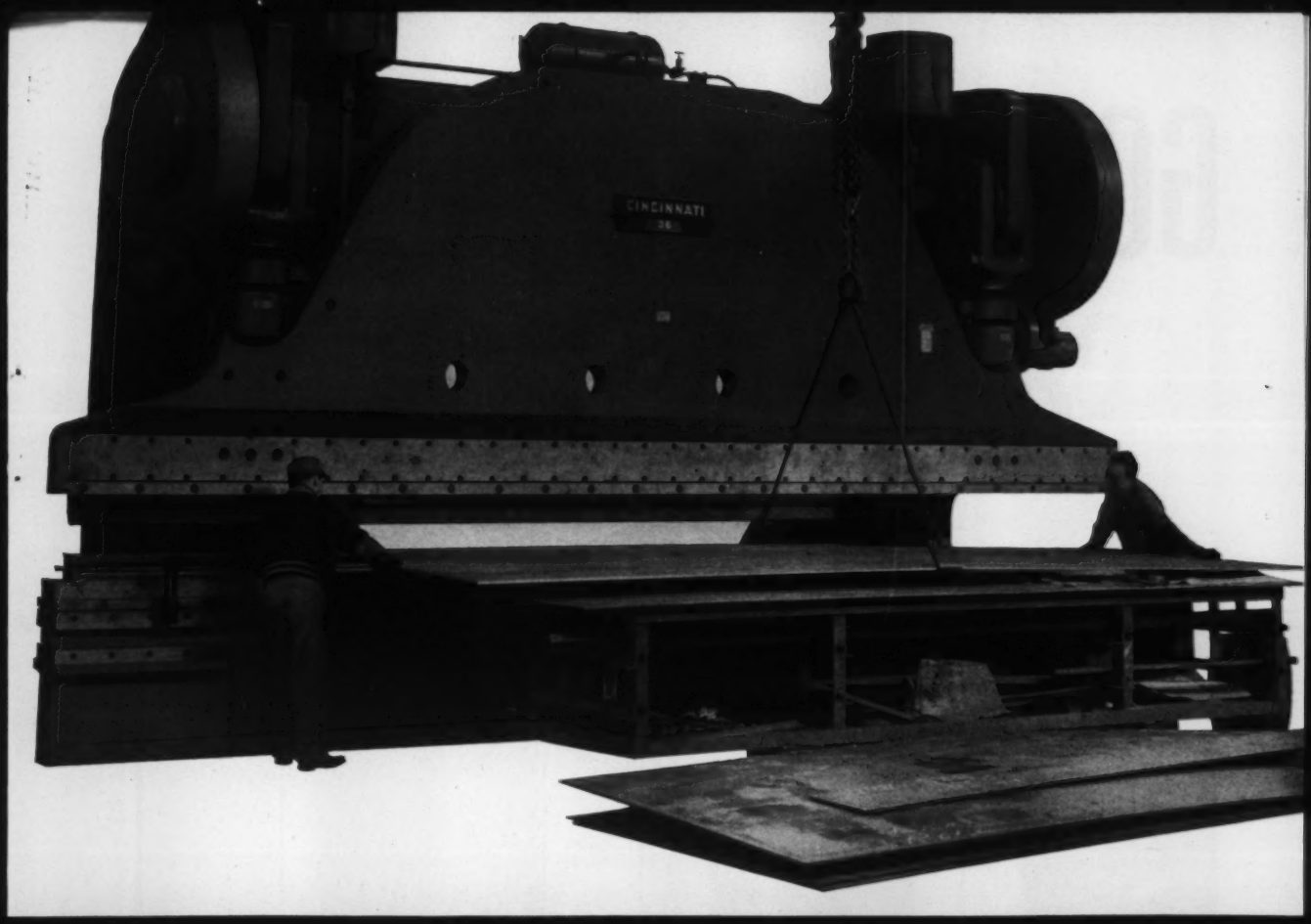
Nov. 27-Dec. 1, Exposition of Chemical Industries: Biennial convention and exhibit, Coliseum, New York. Contact: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

Nov. 27-29, Plumbing Brass Institute: Annual meeting, Savoy Hilton Hotel, New York. Institute's address: 1 Gateway Center, Pittsburgh 22, Pa. Executive secretary: T. H. Nichols.

Nov. 27-30, American Institute of Steel Construction Inc.: Annual meeting, Boca Raton Hotel and Club, Boca Raton, Fla. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

Nov. 28-30, Electronic Industries Association: Section meetings, Statler Hilton Hotel, Los Angeles. Association's address: 1721 DeSales St. N. W., Washington 6, D. C. Secretary: James D. Secrest.

Dec. 1, Malleable Founders' Society: Semiannual meeting, Sheraton-Cleveland Hotel, Cleveland. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.



CINCINNATI® PRESS BRAKE

gets new business

Bigger jobs, fewer welded seams, less handling, and easier operation—McGregor-Michigan Corporation gets all four advantages from this 36 Series Cincinnati Press Brake.

As a result, "this new brake . . . helps us be more competitive with some of the larger shops," says R. Hilprecht, sales manager of this steel plate fabricating shop.

This is another example of the way Cincinnati Press Brakes and Cincinnati Shears are reducing costs and opening up new business for shops across the country. If you don't have the new catalogs on these machines, both mechanical and hydraulic, please write for them.

Shapers / Shears / Press Brakes

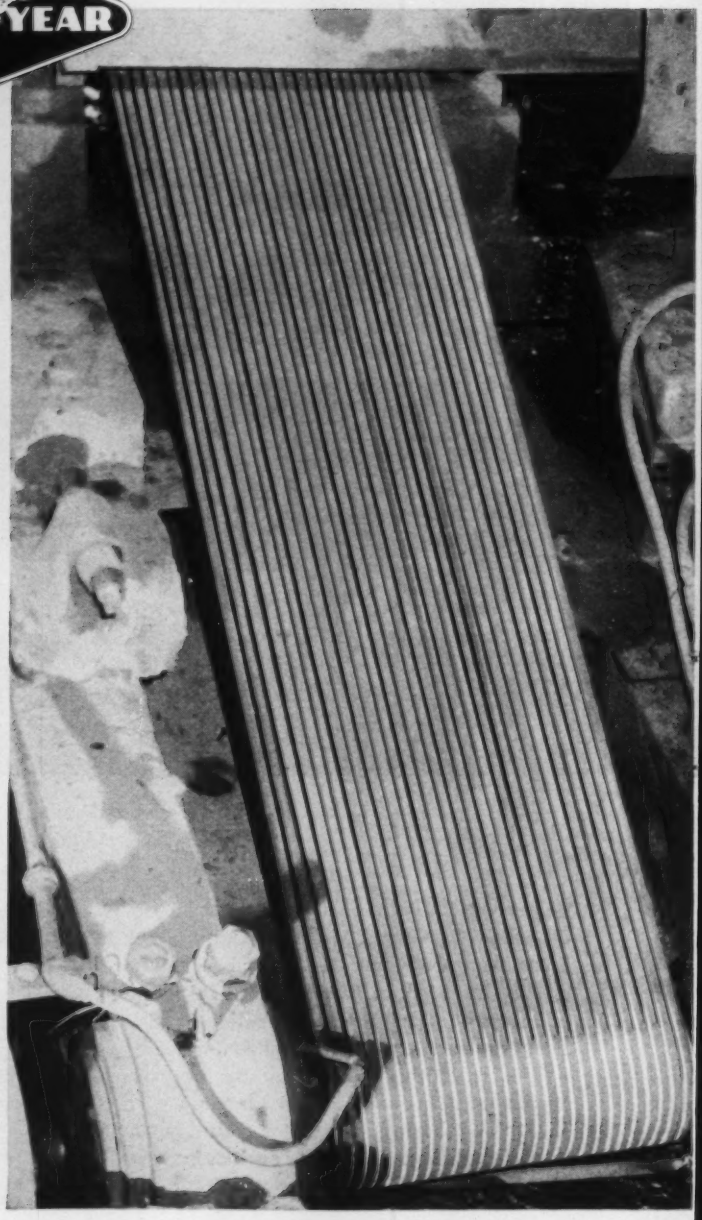
THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

GOODYEAR EXCLUSIVE!
IS YOUR SIGN OF V-

Goodyear V-Belts' precision matching comes from this exclusive close-tolerance matching equipment that length-codes each belt to 1/32″. Most other belt manufacturers code only to 1/10″.



Goodyear V-Belts' precision matching assures standout performance. Example: only 28 COMPASS-V-Steel Belts handle this big steel saw, normally calling for 42 belts. Result: the steel mill saved $500 at the original installation – will save more at every belt change.

THE GREEN SEAL BELTS CODED TO 1/32"

Here's your assurance that every belt in a set matches in length – pulls together for maximum trouble-free horsepower hours

What's more, the Green Seal means –

Dimensional stability that lasts the life of the belt–thanks to shrink- and stretch-resistant "muscles" of 3-T Process Cord or airplane-type steel cable built into each belt.

Satisfactory performance even when subjected to dampness – because of special mildew-inhibited compounds.

The most complete line of V-Belts anywhere today – always within easy reach through a nationwide network of distributor stocks.

The proper selection of V-Belts to meet your requirements with the help of the G.T.M.– Goodyear Technical Man – America's top belting specialist.

So make the GREEN SEAL your sign of savings–in both time and money–by calling your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

INDUSTRIAL PRODUCTS

Green Seal, Compass–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

COLD FINISHED STEEL BARS PROVIDE THE

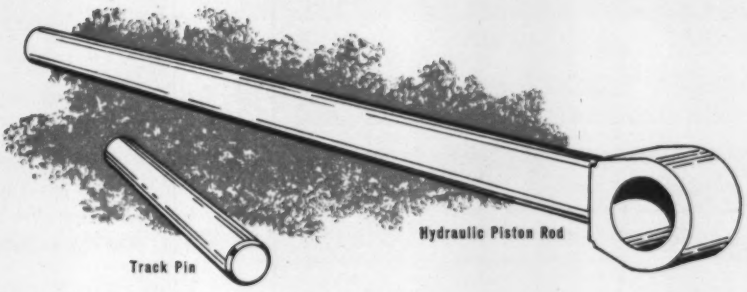
MIGHTY MUSCLES FOR AMERICA'S MOBILITY

America can't move without cold finished steel bars. Every automobile, truck, train, airplane and the equipment that builds the arteries on which they travel, depends on cold finished steel bars.

Take this rugged front-end loader. The hydraulic piston rods—the muscles through which tremendous power surges—are made from the finest cold finished steel bars produced by Bliss & Laughlin. Turned, Ground and Polished bars, precision-made, chrome-plated, strong, hard, straight, free of nicks and scratches, assure a tight, flowing fit against cylinder packings.

Scores of pins made of strong and dependable Bliss & Laughlin cold finished steel bars join crawler track units. Control rods, fittings, fasteners, shafts and studs, among other components, employ various types of Bliss & Laughlin steel bars.

For over 70 years, Bliss & Laughlin has been supplying cold finished steel bars to keep America on the move. Producing the industry's most extensive line of cold finished steels, seven mills across America, collaborating with Steel Service Centers everywhere, assure prompt, helpful, local service.



The chrome plated hydraulic piston rods may be produced from Turned, Ground and Polished C-1144 Strain-Tempered,® C-1045 Lusterized, carbon restored, induction hardened, or alloy grades. The track pins illustrate another type of analysis —C-1050 Lusterized, which may be carbon restored and induction hardened. Bliss & Laughlin can always furnish the most suitable steel for your field service and machining requirements.

BL-619

Leading Independent Producer of Cold Finished Steel Bars

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. **MILLS: Harvey, Ill., Detroit, Cleveland, Buffalo, Mansfield, Mass., Los Angeles, Seattle**

how one simple change jumped production 105%

Look at the long slot that runs the length of this typewriter adapter shaft. It was giving Standard Register Co. a costly production headache. Tubing used could only be milled at 7½" per minute. Finish was poor. Warping and twisting ran rejects to 25%.

Then Ryerson studied the situation and suggested a change in material—to Ledloy® 170 tubing. Using the same tooling, Standard now mills 15½" per minute—more than double former production. And rejects dropped to zero—the slot is smooth and straight as a die. See for yourself.

How about you? Shouldn't you invite this kind of close look at the material in your products, equipment and plant? A Ryerson specialist may well help you boost production and cut costs in some ways you never thought of. Metalogics is like that.

RYERSON

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND STEEL FAMILY

METALOGICS

PLUS VALUES IN STEEL • ALUMINUM • PLASTICS • MACHINERY

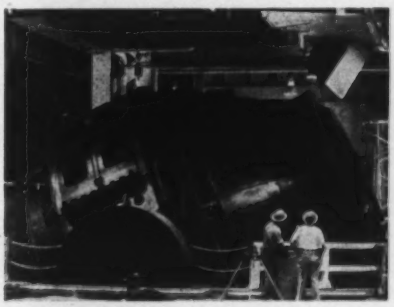
Purchasing Agents Are Optimistic

A continuation of improved business conditions during October is reported by the Purchasing Agents Association of Chicago. The buyers say: Production remains strong with little change in inventory levels; some increased leadtime is needed to offset lagging deliveries; new orders and employment are slowing slightly; and price increases continue to appear. Forecast for the fourth quarter (as compared with the third): 62 per cent of the agents expect better conditions vs. 8 per cent on the pessimistic side. For the first quarter of 1962: 72 per cent look for improvement, while 7 per cent expect worse conditions.

Nationalize the Steel Industry?

Inadequate steel producer profits "could lead to the nationalization of the industry," warns Joseph L. Block, chairman, Inland Steel Co. He thinks it could come about this way: If union strength "continues to be used to push wage and benefit increases beyond the long range average national and industry productivity gains and if government uses its great power to keep the lid as tight as possible on price increases."

Giant Furnaces Will Feed New Strip Mill



This is one of the two basic oxygen steelmaking furnaces installed at Jones & Laughlin Steel Corp.'s Cleveland Works. Steel produced in the 240 ton capacity furnaces will be processed in a new, $60 million hot strip mill at speeds up to 3750 fpm. The firm expects to have the mill in operation late in 1963. For more details, see Page 141.

Stainless Output May Exceed 1 Million Tons a Year

Look for a rate of growth in stainless steel output between 4 and 5 per cent a year, "barring any new major market breakthrough," says E. J. Hanley, president, Allegheny Ludlum Steel Corp. His forecast: "Industry shipments of stainless steel products will surpass 1 million tons per year during this decade compared with shipments of about 690,000 tons in 1956."

Plant Obsolescence: A Matter of Stars and Stripes

"Obsolescence of plant equipment is no longer just a matter of dollars and cents—it is also a matter of stars and stripes," said Robert Sheridan, president, Nationwide Leasing Co., at the American Gear Manufacturers Association convention in Chicago. Warned Mr. Sheridan: "Creeping obsolescence of our industrial plant is gradually whittling away at our advantage over competing economies. Every year, 2 per cent more of our equipment slips over

the ten-year-old mark that stamps it as obsolete. Today, 68 per cent of our equipment is more than ten years old, the highest figure since the depression of the thirties."

New Plate Mill Adaptable to Programed Operation

Alan Wood Steel Co.'s new $36 million plate mill at Conshohocken, Pa., has been built with an eye to future programed operations. Conduits have been installed in the foundations so that card programing equipment can be quickly installed. Future capital expansion will include a six stand, hot strip finishing train and new melting equipment, says Harleston R. Wood, president. The melting equipment will probably be L-D, Stora-Kaldo, or some other pneumatic process. See Page 164.

Alcoa to Divert Small Orders to Distributors

Aluminum Co. of America is making a move to give service centers a more important role in aluminum distribution. As of Nov. 13, the company says it will not accept orders for standard sized sheets and plates in quantities under 4000 lb and will decline orders for most nonstandard lots of less than 2000 lb. "Distributors, most of whom are already equipped to do so, will be expected to roller level, slit, shear, and saw sheets and plates from standard sizes to meet the specifications of small order customers."

Electrical Field Using More Aluminum

Electrical applications took over third place from containers and packaging in the Aluminum Association's tabulation of shipments by end uses in the April-June quarter. Building products continue to rank first, transportation second. Here's the breakdown for major end uses:

Percentage of Total Shipments for Three Month Periods Ended:	June 30 1961	Mar. 31 1961	June 30 1960	Mar. 31 1960
Building Products	23.8%	18.9%	23.8%	18.6%
Transportation	13.1	13.8	14.5	18.0
Electrical	11.4	8.6	10.7	9.6
Containers & Packaging	10.1	12.4	9.4	9.5
Consumer Durable Goods	9.5	10.7	10.6	12.6
For Conversion into Wrought Products	5.4	6.3	6.3	9.0
Machinery & Equipment (except electrical)	4.1	5.1	3.8	4.3
Exports	2.2	2.4	1.1	1.0
Other	2.4	2.2	2.6	2.4
Unidentified End Uses	1.0	1.1	0.8	0.9
Distributors & Jobbers	17.0	18.5	16.4	14.1

Auto Labor Pacts Raise the Floor

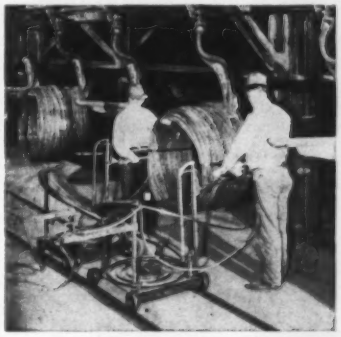
The auto labor settlements will put a higher floor under wage and fringe settlements for the rest of 1961 and all of 1962. The cost of the contracts for each of the Big Three will run about 12 cents per production employee per hour during the first year of the contract, and 34 cents for the full three years. General metalworking settlements in the first nine months of 1961 had been averaging about 10 cents an hour per year. The Big Three signed for 23 cents an hour for three year pacts in 1958 and around 29 cents in the 1955 settlement.

Maytag-UAW Contract Establishes Voluntary Bonus Plan

The three year contract negotiated between Maytag Co. and UAW Local 997 establishes a voluntary yearend bonus plan. The company says the bonus fund is to be created by withholding 2 per cent of each participating employee's gross earnings each week. The amount accumulated by each employee will be matched by a company contribution when the bonus is paid shortly before Christmas each year.

How Package Machinery Makers Help Chop Costs

Two, 900 lb coils of rods are strapped in 30 seconds with Signode Steel Strapping Co.'s mobile tools. Significance: Higher speeds and greater efficiencies. At last week's packaging equipment show, companies displayed special machines, especially automatic units for building block applications. Target: A $300 million to $400 million annual market. Sales are expected to rise 20 per cent this year. For other developments, see Page 122.



Inventories Up, Volume Down

Inventories of manufacturers, wholesalers, and retailers increased by $600 million in September—the biggest monthly rise since May, 1960, says the Commerce Department. September sales, affected by a dip in wholesale volume, dropped nearly 1 per cent from the August level.

36 Million Calculations an Hour

This computer center can perform scientific computations while simultaneously handling business problems. In one test, it computed the trajectory of a lunar mission—involving 36 million calculations—in an hour. It's part of the new $5 million aerospace facility dedicated at Minneapolis by Aerospace Div., Minneapolis-Honeywell Regulator Co.

Industry Notes

The Industrial Fasteners Institute reports both August and September shipments were 5 per cent below the 1956-58 average . . . Gearing industry bookings dropped 11.6 per cent from August to September, says the American Gear Manufacturers Association . . . The Metal Treating Institute says

STEEL The Metalworking Weekly

November 13, 1961 Vol. 149 No. 20

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billings totaled $3,325,900 in September, up 0.1 per cent from the year ago level but slightly below that of August. Billings for the first nine months trailed last year by 7.1 per cent.

Solved: Some of Tomorrow's B-70 Welding Problems

The man with the welding torch isn't a new arrival from outer space—he's an earthling wearing the protective clothing needed to protect him from the 600° F heat of a B-70 part made from H-11 tool steel. North American Aviation Corp., Los Angeles, has worked out a variety of techniques to handle superalloys like Rene 41, Armco PH 15-7 Mo, and titanium in thin sections. To learn how they do it, see the story beginning on Page 156.

Straws in the Wind

Company costs for employee medical services have increased more than 10 per cent in the last five years, shows a survey by the National Industrial Conference Board . . . Dun & Bradstreet Inc. reports that new business incorporations continued their slow climb in September, reaching the mid-1959 level on a seasonally adjusted basis . . . The National Aeronautics & Space Administration is staging a nationwide recruiting drive. By June, 1962, about 3500 will be hired—2000 will be engineering and scientific personnel at salaries ranging up to $21,000 . . . New construction put in place in October amounted to $5.3 billion, says the Commerce Department. The seasonally adjusted annual rate ($58.457 billion) was slightly below that of September . . . Small plants pay the lowest wages and larger plants—employing 5000 or more—pay the highest, shows a survey of member companies by the Electronic Industries Association . . . On Nov. 3, members of UAW Local 72 at the Kenosha, Wis., plant of American Motors Corp. voted to accept the three year contract which they had opposed in an Oct. 8 poll.

Metalworking Pulse

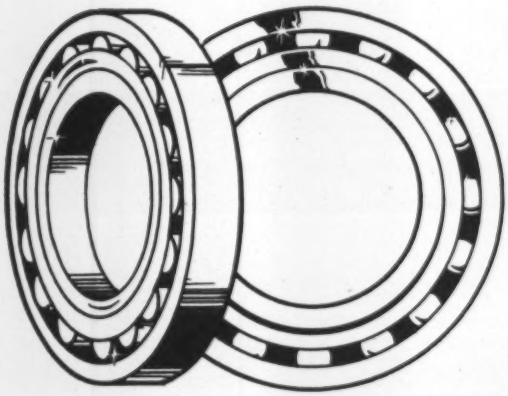
The Business Trend: Minor downward fluctuations in auto and steel production caused a 1 point dip in STEEL's industrial production index for the week ended Nov. 4. **Autos:** Fourth quarter output of new cars is expected to be the second highest in history for that period. High level operations are expected to continue well into 1962. **Steel:** Ingot production continued at a steady rate, keeping pace with shipments. No substantial change is expected during November.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49 = 100)
  Week ended Nov. 4 . . . . 174†
  Year ago 151
  Details on Page 131
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Nov. 11 . 155,000*
  Year ago 138,682
  Details on Page 128
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Nov. 11 2,044,000*
  Week ago 2,044,000
  Details on Page 226

†Preliminary. *Estimated.

NEWS!

KAYDON NOW REDUCES PRICES ANOTHER 25% TO 42% FOR "CP" BALL RADIAL BEARINGS AVAILABLE "OFF-THE-SHELF"



Low prices are also being quoted on many other ball and roller bearings ...both standard (4" bore and larger) and special (2" bore and larger).

You can now save on many of your current and future purchases of these bearings.

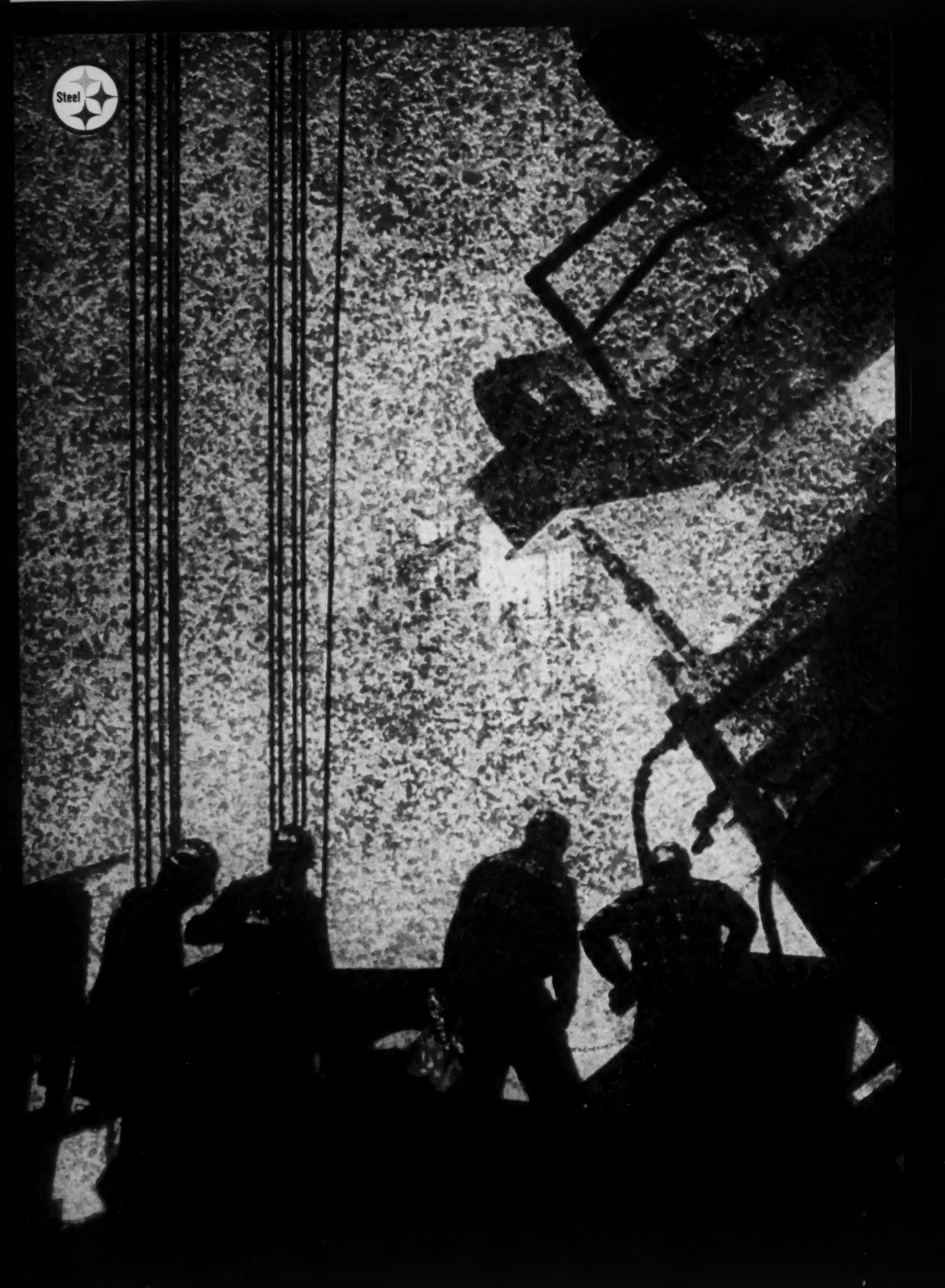
Send your inquiry now! Write, wire, or call Kaydon, Muskegon, Michigan. Phone: PLaza 5-3741.

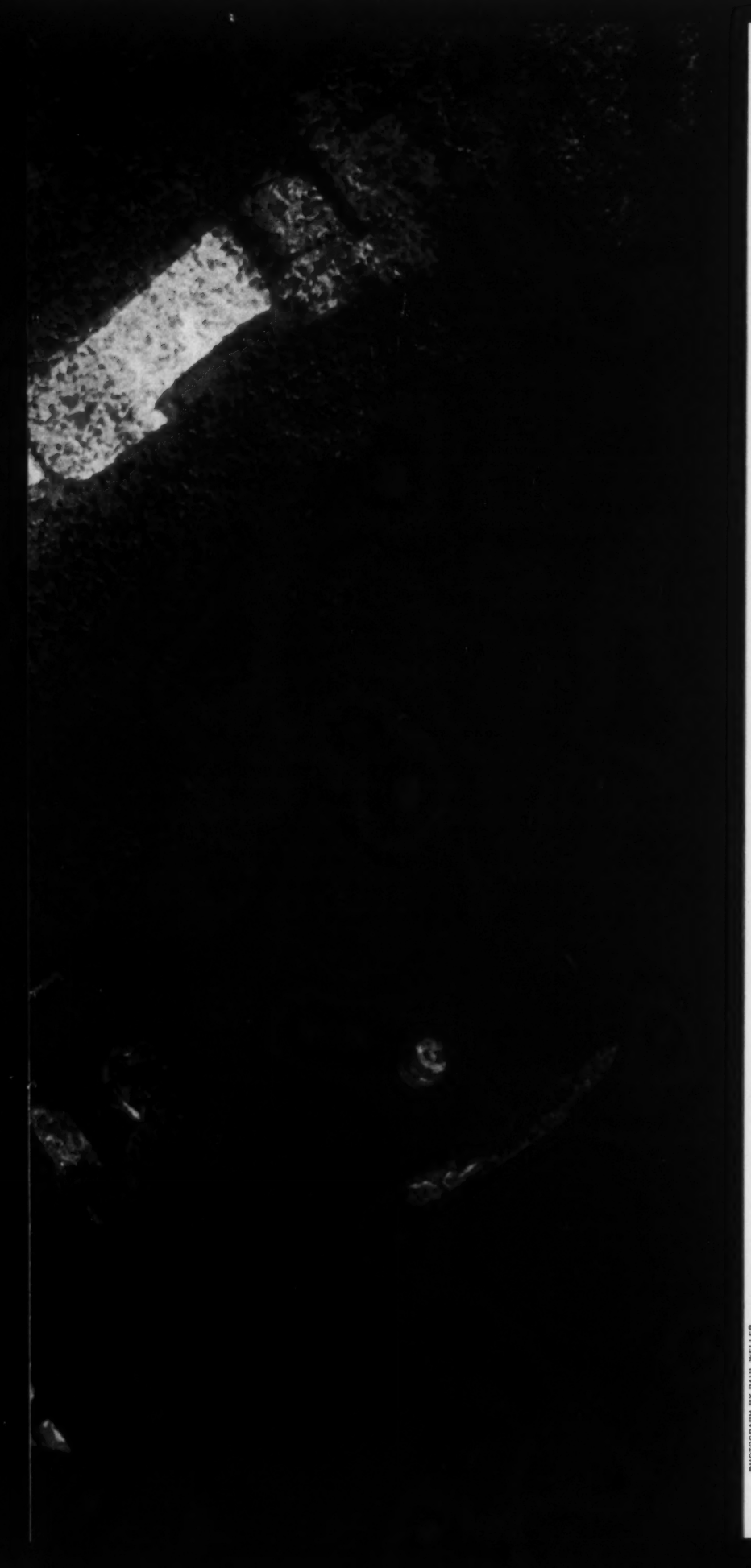
K-619

20th YEAR KAYDON 1941 1961

THE KAYDON ENGINEERING CORP.
•MUSKEGON, MICHIGAN

All types of ball and roller bearings — 2" inside diameter to 178" outside diameter . . . Taper Roller Roller Thrust • Roller Radial • Needle Roller • Ball Radial • Ball Thrust • Four-Point Contact Bearings


Steel



THE IMPELLING URGE

Of a steelmaking specialist. To be a step ahead. In equipment. In versatility ■ Tilt the mammoth electric furnace. Pour the molten stream. Steels for bridges, missiles, refineries and a host of other industrial uses. From a modern electric furnace comes the vast variety of special-duty steels essential to the skilled builders of such vital projects ■ The urge for versatility and product range is a characteristic long associated with Lukens in the making of plate steels. Carbon steels by the thousands of tons. Special-duty clad and alloy steels. Armor steels. Heads and steel plate shapes. It is one of many characteristics that make Lukens—

THE SPECIALIST
IN PLATE STEELS

LUKENS STEEL

COATESVILLE, PA.

PHOTOGRAPH BY PAUL WELLER

HOUGHTON QUENCHANTS

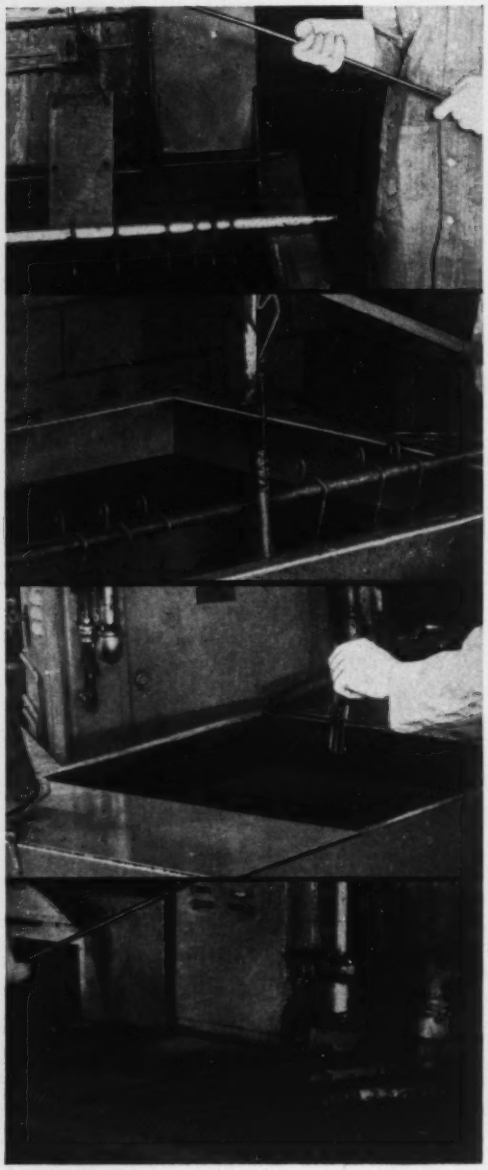
The role of the quench in precision heat treating

Illustrated here are four different quenches and techniques that help build the required strength, durability and precision into a variety of machined parts. To get precise physical properties, the selection of the proper quench is just as important in heat treating as temperature and steel analysis.

Heat treating—the vital "last step" in getting the most from metal—is an exact science that requires an expert's experience and judgment. Your Houghton Man offers you this type of help in selecting and servicing of a full range of oils and salts developed specifically for quenching, as well as salts for carburizing, hardening, tempering and nitriding. Call him today or write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

FREE QUENCHING BOOKLET!

New, illustrated, 70 pages of authoritative data on quenching materials and techniques. Write for your copy.



■ **For maximum hardness and wear resistance** Houghto-Quench "K" effectively transforms austenite to martensite. Houghto-Quench "K" is the high speed quench oil that quickly removes heat from steels . . . "the fastest quench this side of water".

■ **For good hardness and exceptional dimensional accuracy in quenching from liquid carburizing baths,** Houghto-Quench 4-C provides just the right cooling rate to insure adequate hardness without warping.

■ **For high hardness, accuracy and no spalling in induction heated parts,** Houghto-Quench "G" quickly removes the heat without danger of distortion or quench-cracks.

■ **For maximum dimensional accuracy and toughness,** Mar Temp Salt is the answer for precision parts which need long fatigue life. Martempering in Houghton salts provides physical properties difficult to obtain by any other quench method.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

Philadelphia • Chicago • Carrollton • Detroit • South San Francisco • Toronto

How a Design Engineer took the fatigue cracks out of a high-stress turnpost

Designed originally as a weldment, this turnpost for a hydraulic loader was failing too often in the field—particularly when severely overloaded during sub-zero winter logging operations.

Analysis of failures indicated abnormal buildup of loads at stress concentration points in the heat-affected area of the weldment. Fatigue cracks also appeared in the top plate shoulder because of unyielding stiffness at the weld line. Undesirable permanent set in the weldment developed below the shoulder prior to failure.

The turnpost was converted to a forging without the necessity for redesign of any other assembly component—with a cost reduction of $7.72 per turnpost. The log-loader manufacturer reports . . . "we have received no complaints about turnpost failures since changing to a forged part."

Read details of this forging application on the following pages.

FORGED

FOR RELIABILITY

Specifically...

The combination of improved properties provided by forgings eliminated failure from overloads, mechanical shock, and sudden stress reversals on unloading.

The unique long-fiber grain structure of the forged part—a myriad of microscopic "reinforcing bars"—was oriented at right angles to the severest stresses, providing maximum strength at critical points.

High strength of the forged turnpost provided an estimated 45 per cent increase in fatigue resistance at points of maximum stress concentration with a 25 per cent reduction in average wall thickness. Excessive stiffness and rigidity associated with the former massive column design was eliminated.

Because forgings are made from the best grades of rolled bar stock and never pass through the liquid state during production, they contain no voids, gas bubbles, unwanted segregates, or dangerous inclusions. Such faults can impair value and hike end costs, particularly where machining is required.

In summary, by converting to a forging the designer put to work this particular combination of forging properties:

1. High modulus of elasticity
2. Maximum impact strength
3. Low mechanical hysteresis
4. High fatigue resistance
5. Stress-oriented grain structure
6. Solid, void-free metal

CASE STUDY REPORT

Learn how the designer licked this turnpost design problem. Write for the CASE STUDY REPORT complete with drawings, photographs and full technical information—available without charge on request. Mail your request to Drop Forging Association 55 Public Square • Cleveland 13, Ohio. • Dept. ST-1

When it's a vital part, design it to be FORGED

Modern forging equipment and technology keep forging plants modern in production, competitive in price.

Even greater uniformity of parts is achieved by this fully-automatic forging line now in operation at a modern forging plant. Automatic cycling and transfer of forging stock speeds production, keeps parts costs down, improves quality and tolerances of forgings, benefits forgings users.

Careful quality control and uniformity of finished forgings begins with a preliminary visual inspection which is followed by precision dimensional checking.

This mechanized "stack-rack" manipulator in a modern forge shop helps store precise forging dies weighing hundreds of pounds in easy-to-reach racks, eliminates die damage, speeds delivery of dies to the forging-equipment area.

THE FOLLOWING COMPANIES OF THE FORGING INDUSTRY HAVE SPONSORED THIS INFORMATIVE SERIES OF CASE STUDIES:

CALIFORNIA
California Drop Forge Company • Los Angeles, Calif.
Kortick Manufacturing Company • San Francisco, Calif.

CONNECTICUT
The Billings and Spencer Company • Hartford, Conn.
Wilcox-Crittenden Div., N. & J. Mfg. Co.
Middletown, Conn.

ILLINOIS
AmForge, Div. American Brake Shoe Co. • Chicago, Ill.
Clifford-Jacobs Forging Company • Champaign, Ill.
Commercial Stamping & Forging, Inc. • Chicago, Ill.
Cornell Forge Company • Chicago, Ill.
Englund Forge Company Inc. • Bensenville, Ill.
A. Finkl & Sons Co. • Chicago, Ill.
Forgings & Stampings, Inc. • Rockford, Ill.
Kropp Forge Company • Chicago, Ill.
Modern Drop Forge Co. • Blue Island, Ill.
Pettibone Mulliken Corporation • Chicago, Ill.
Rockford Drop Forge Co. • Rockford, Ill.
Standard Forgings Corporation • Chicago, Ill.
Taylor Forge & Pipe Works • Chicago, Ill.

INDIANA
Broderick Co., Div. of Harsco Corp. • Muncie, Ind.
Indianapolis Drop Forging Co., Inc. • Indianapolis, Ind.
Portland Forge, Incorporated • Portland, Ind.

MAINE
Thos. Laughlin Div., Amer. Hoist & Drk. Co.
Portland, Me.

MASSACHUSETTS
Cape Ann Tool Company • Pigeon Cove, Mass.
H. E. Holbrook Drop Forge, Inc. • Worcester, Mass.
Porter Forge & Furnace Inc. • Somerville, Mass.
Storms Drop Forging Company • Springfield, Mass.
Wyman-Gordon Company • Worcester, Mass.

MICHIGAN
Buchanan Steel Products Corporation • Buchanan, Mich.
Federal Drop Forge Company • Lansing, Mich.
Huron Forge & Machine Company • Detroit, Mich.
Michigan Forging Company • Dearborn, Mich.
Rockwell-Standard Corp., Forge Div. • Detroit, Mich.

NEW JERSEY
Garden State Forge Company • South Plainfield, N. J.

NEW YORK
The Brewer-Titchener Corporation • Cortland, N. Y.
The E. D. Clapp Mfg. Co., Inc. • Auburn, N. Y.
Endicott Forging & Mfg. Co., Inc. • Endicott, N. Y.
Merrill Brothers • Maspeth, N. Y.

OHIO
The Alliance Drop Forging Company • Alliance, O.
The Ashtabula Bow Socket Company • Ashtabula, O.
The Champion Rivet Company • Cleveland, O.
Columbus Bolt & Forging Co. • Columbus, O.
Eaton Manufacturing Co., Marion Div. • Marion, O.
The Harris-Thomas Drop Forge Co. • Dayton, O.
Poor & Co., Canton Forge & Axle Works • Canton, O.
H. K. Porter Co., Forge & Fittings Div. • Cleveland, O.
The Steel Improvement & Forge Co. • Cleveland, O.
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PENNSYLVANIA
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WISCONSIN
Interstate Drop Forge Co. • Milwaukee, Wis.
Ladish Co. • Cudahy, Wis.
Milwaukee Forge & Machine Company • Milwaukee, Wis.
Unit Drop Forge, Div. Eaton Mfg. Co. • Milwaukee, Wis.
Walker Forge, Inc. • Racine, Wis.

CANADA
Canadian Warren Pink Limited • St. Catharines, Ontario
Dominion Forge Co., Div. Canman Ind. Ltd.
Windsor, Ontario

When it's a vital part, design it to be FORGED

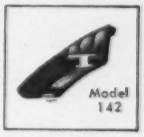
ENGINEERED OIL SEALS for Steel Mills

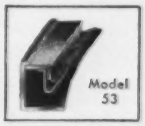
Garlock KLOZURE* Oil Seals (left) help keep lubrication in, dirt out of roll neck bearing at Inland Steel's East Chicago mill.

Inland Steel applies Garlock KLOZURE Oil Seals for protection of mill roll neck bearings at East Chicago.

Minimizing lubrication leakage from the inboard and outboard ends of the bearings, Garlock KLOZURE Oil Seals provide more constant service as the rolls change position in a lateral movement during operation. Inland finds, too, that in atmospheres of dirt, scale and spray, KLOZURE Oil Seals help keep foreign particles from entering—and damaging—the bearings.

For good, economical bearing protection, Inland joins the growing list of steel producers who use Garlock KLOZURE Oil Seals. Wherever you look in mills, you'll find a specific type of KLOZURE Oil Seals doing a specific job. Model 142, for instance, helps keep water splash and scale out of bearings at the shoulder of mill rolls. Models 64 and 82 protect bearings on back-up and work rolls. Model 53 is recommended for table rolls at normal and high speeds. Model 23 Split KLOZURE is ideal where equipment cannot be dismantled too easily.





Designed for peak efficiency and durability, Garlock KLOZURE Oil Seals resist oil and grease, are impervious to water, mild acids, alkalies, withstand temperatures from −40°F to +250°F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500°F.

If you have a particular sealing problem, why not discuss it with your Garlock representative. He's backed by over 70 years of experience in engineering, production and application. Call him at the nearest of the 26 Garlock sales

GARLOCK

offices and warehouses throughout the U. S. and Canada. Or, write for Catalog AD-181, Garlock Inc., Palmyra, New York.

Canadian Div.: Garlock of Canada Ltd.

Plastics Div.: United States Gasket Company

Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.

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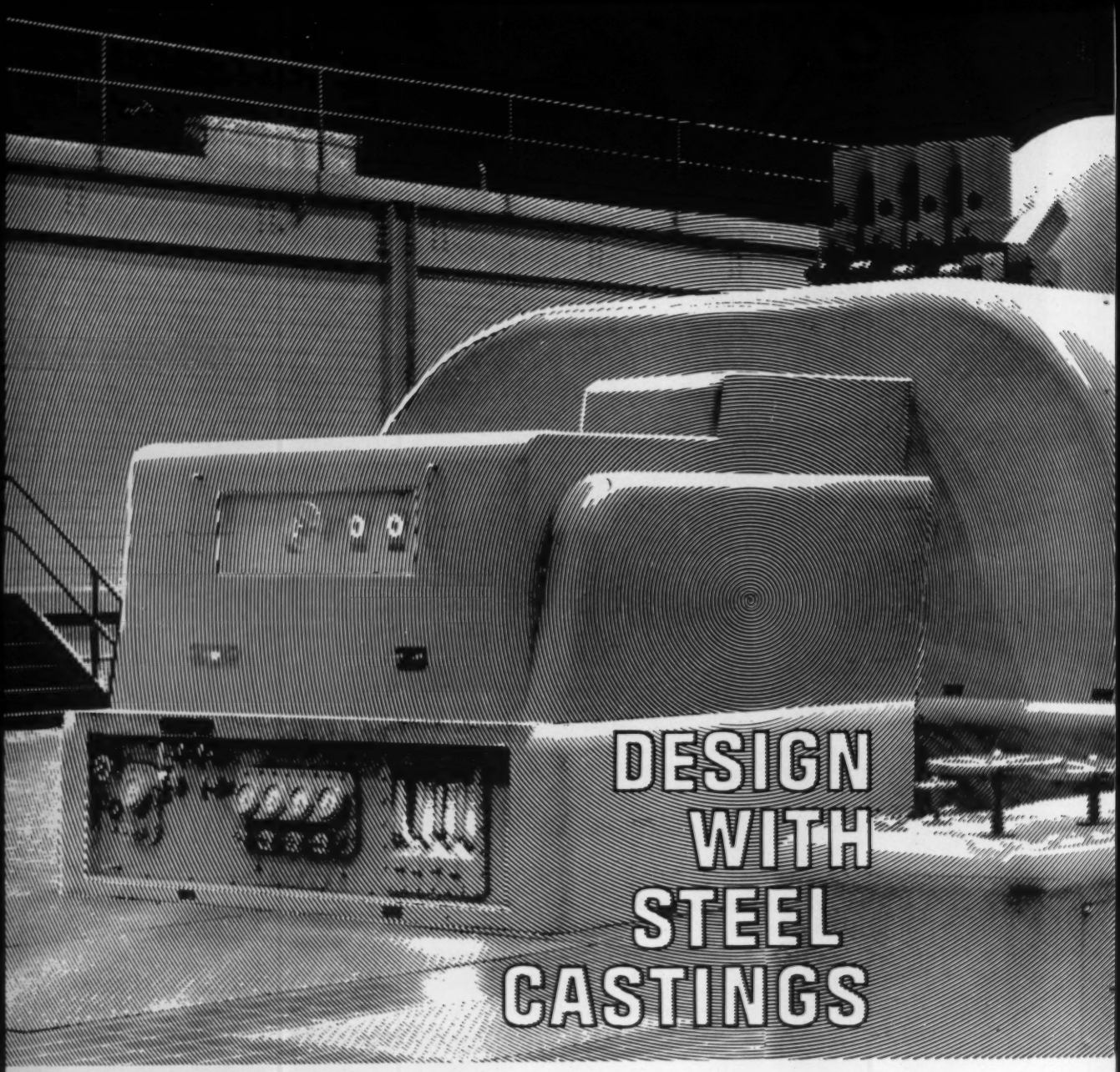


for low end cost

Take a *dollars-and-sense* approach to component costs at the planning stage. You'll soon discover how quickly steel casting expense ends and benefits begin.

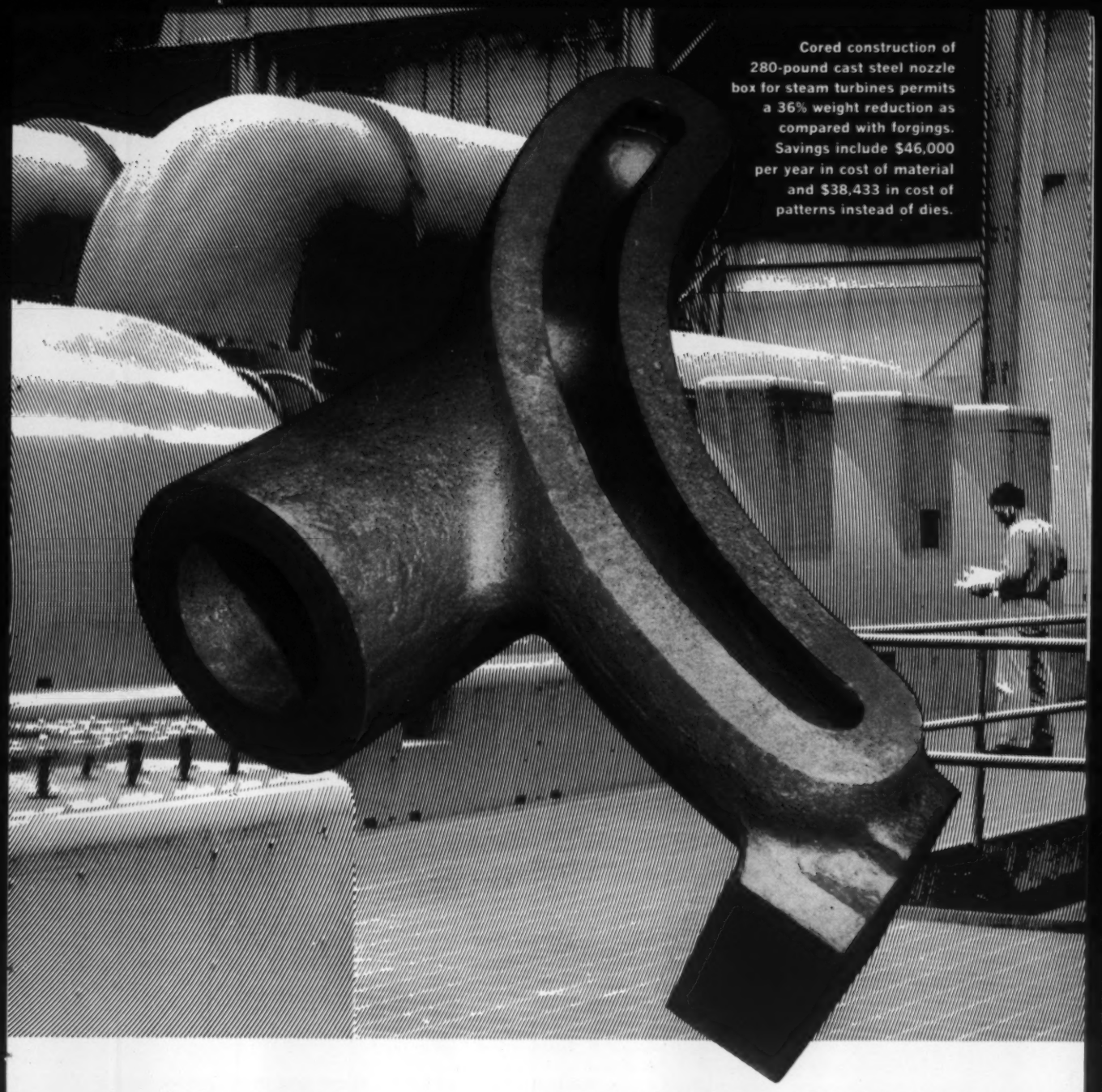
Steel castings don't require costly dies, or special tools, shears or presses. They're made with patterns. And they can be cast to final contour. You minimize milling and boring, die sinking and planing, contouring and profiling.

Then too a steel casting is an *integral* unit. Not a collection of pieces that must somehow be put together. You eliminate assembly costs—and costly assembly errors.

And steel castings slash material and shipping costs by giving strength without dead weight.

Steel castings meet the designer's desire for flexibility, the production man's concern with manufacturing economy, the customer's demand for low-cost dependability.

Talk with your steel foundryman. Learn how your vital components can be cast for optimum economy, strength and shape.



Cored construction of 280-pound cast steel nozzle box for steam turbines permits a 36% weight reduction as compared with forgings. Savings include $46,000 per year in cost of material and $38,433 in cost of patterns instead of dies.

low end cost plus

FUNCTIONAL DESIGN . . . metal where you need it.

WIDE SELECTION OF PROPERTIES . . . for a variety of demanding applications.

BENEFICIAL GRAIN STRUCTURE . . . assures optimum multi-directional strength.

DIMENSIONAL UNIFORMITY . . . consistent duplication of the part.

SHOCK RESISTANCE . . . for shock and impact resistance in compression, tension, torsion and shear.

SERVICE STABILITY . . . resists deflection and deformation of parts.

CAST-WELD & COMPOSITE FABRICATION . . . permits economical joining of single castings, or fabricating with other materials.

PROCESS FREEDOM . . . can be readily hot or cold pressed, brazed, plated, coated, and many other process operations.

Advantages of steel castings and complete engineering information are detailed in the STEEL CASTINGS HANDBOOK. Send the coupon for information about this 680-page book.

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precise tubing

In a wide selection of seamless and welded and drawn up to 1" O. D.

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- Glass-to-Metal Sealing Alloys
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- Composite Wires . . . Base and Precious Metals

Write for Bulletin No. 13

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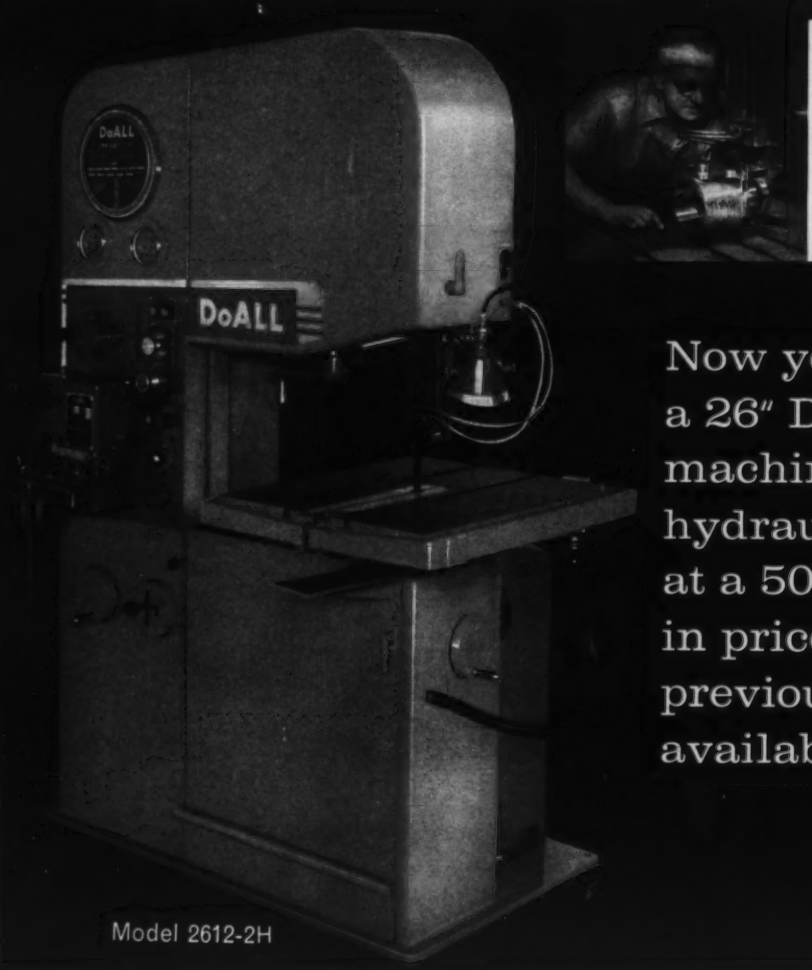

Model 2612-2H

a DoALL PRODUCTIVITY-PLUS product

Now you can buy a 26" DoALL machine with hydraulic table at a 50% saving in price over previously available models

Same throat capacity . . . same worktable features . . . coolant system . . . same cutting rates with Demon® HSS blades*

Model 1612-U
only $995.00
(Base Machine)

Another DoALL bargain

—a multipurpose Utility machine with built-in DoALL quality and performance. Has 16" throat and 12" thickness capacity.

Uses new Dart® blades that outcut and outlast any other carbon steel blades—or your money back!

Ask for demonstration.

Everything about this new DoALL model 2612-2H band machine is almost identical to DoALL's famous 26" Contour-matic® machine. Principal differences are in table size and elimination of certain hydraulic controls—*but the price is 50% lower* . . . only $5750.00 (base machine).

You get the hydraulically powered, infinitely variable feed table that tremendously multiplies your operator's productivity, lets him turn out more work with less effort, whether it's a one-of-a-kind job or production run.

You get the full 26" throat capacity, the built-in coolant system, and all of the standard equipment, including one Demon high-speed-steel saw band that will deliver cutting rates up to 12 square inches per minute in mild steel.

Here is a tremendous buy never before available in a genuine DoALL power feed machine of this size and capacity—and it has DoALL quality and performance through and through.

Get all the facts before you buy any vertical contour sawing machine—call DoALL today.

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Serving you locally through your DoALL Sales-Service Store

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B-67

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*Reg. T.M.—The DoALL Company

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Price $10,338
Model 2613-3
Rent $86.21 per week
Contour-matic®
23 types
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Rent $17.70 per week
6 types
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18 types
All sizes

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SHOP BLOCKS* 84 pcs.

Price $285

18" x 24" Price $80
All sizes, grades

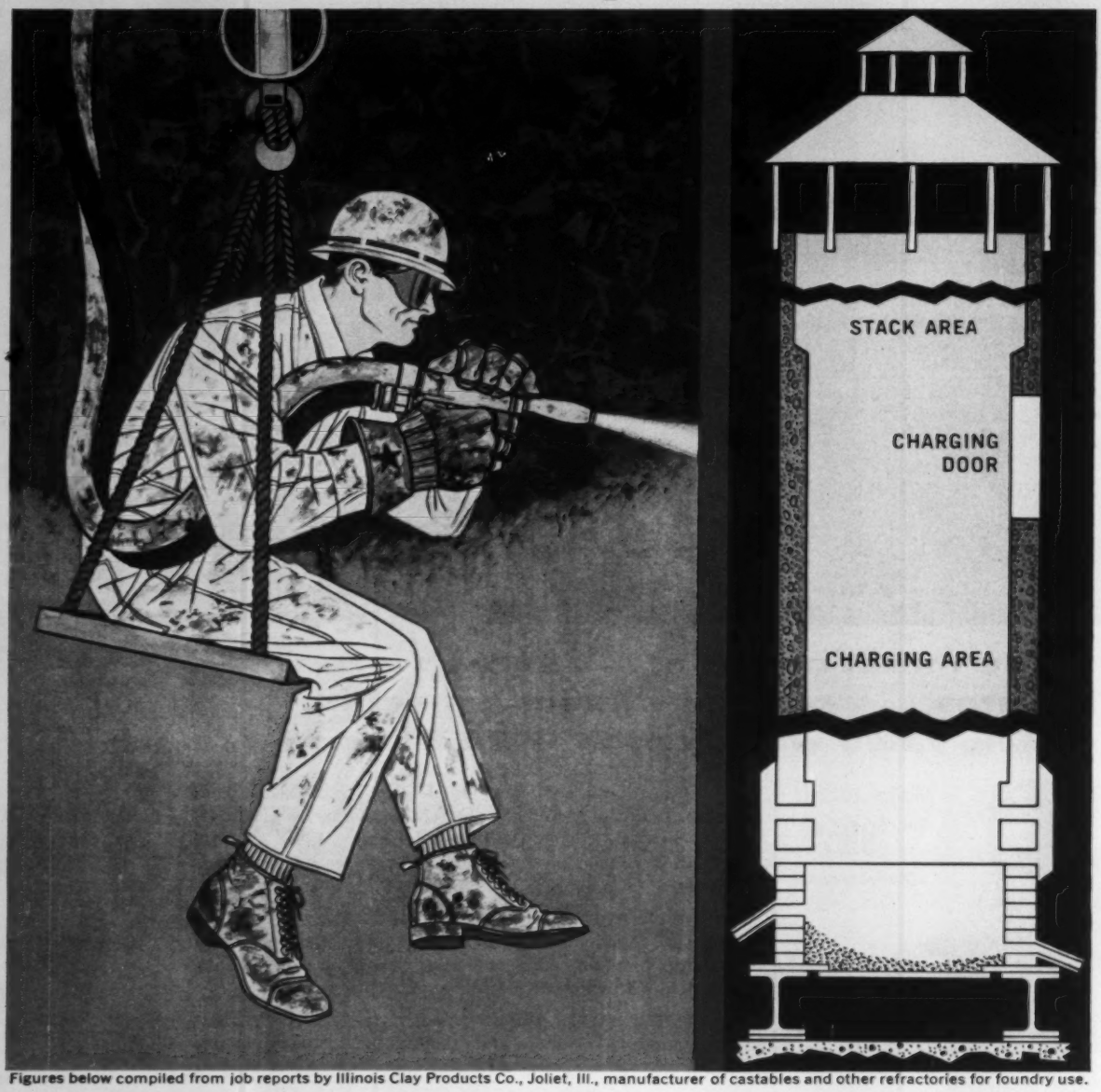
SHOP SUPPLIES

For Every Purpose

2,000 Sizes • grades

Find Your DoALL STORE In The "Yellow Pages"

Line cupolas, by gun, with monolithic refractory castables!



Figures below compiled from job reports by Illinois Clay Products Co., Joliet, Ill., manufacturer of castables and other refractories for foundry use.

Foundries that use castables made with LUMNITE calcium-aluminate cement to line cupolas have cut installation time 75%, reduced refractory costs 43%, and increased lining life 78%.

Gun-applied castables in the charging zone and upper stack of cupolas form a strong, joint-free lining that offers greater resistance to erosion. The concrete lining may be gunned to any thickness, actually helps reinforce the shell, reaches full strength in 24 hours.

Castables for cupola linings are available from leading manufacturers of refractories. For details on the use of LUMNITE cement, write Universal Atlas, 100 Park Avenue, New York 17, N. Y.

Universal Atlas Cement
Division of
United States Steel

"USS" AND "LUMNITE" ARE REGISTERED TRADEMARKS. L-214

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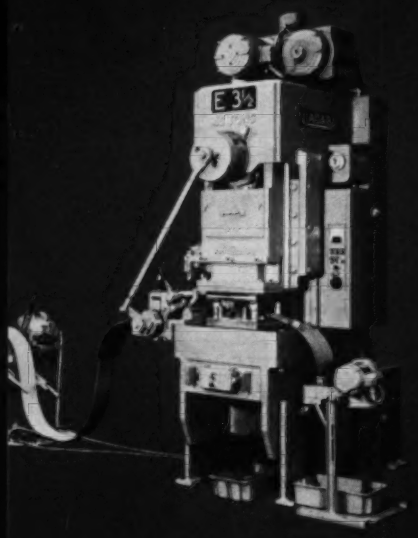
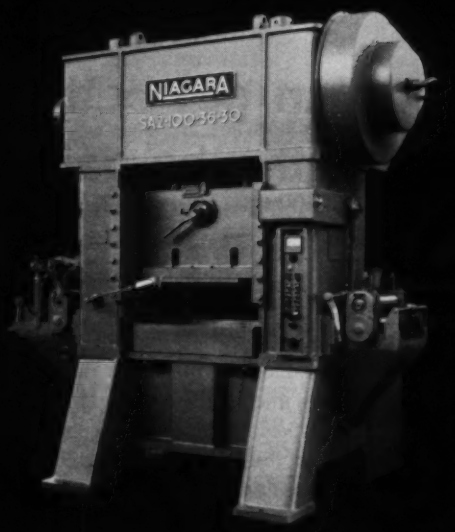
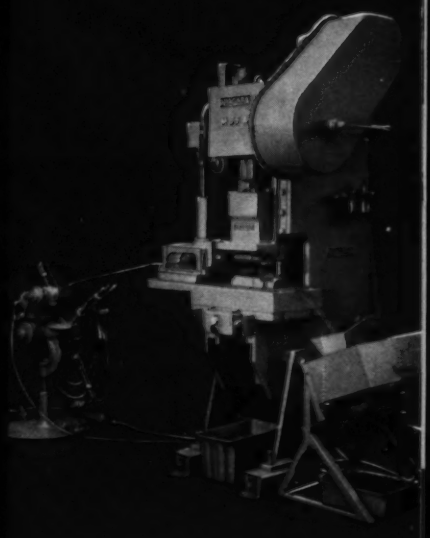
PRECISION PARTS BY THE MILLIONS



SERIES E — FRONT-TO-BACK CRANKSHAFT OBI's
Capacities: 45 to 200 tons.
45-ton model (above) stamps out fuse tips at rate of million/day.



SERIES SA-2 STRAIGHTSIDE AUTOMATICS
Capacities: 25 to 300 tons.
100-ton package (above) includes double roll feed, stock reel, scrap cutter.



SERIES M — ULTRA-HIGH SPEED OBI's
Capacities: 22 to 60 tons.
35-ton model shown operates at adjustable speeds up to 1000 spm and produces parts at rate of million/day.

3 great Niagara lines excel in automatic, high speed, progressive die work

Premium construction: It's the key to premium performance here! These modern Niagara presses are designed strictly for automatic, high speed, progressive die work.

Model for model, they'll turn out more parts per hour than conventional presses of equivalent tonnage can even approach. Far heavier and more massive, they have the ruggedness, rigidity, and stamina to run vibration-free at high speeds.

Providing more guiding surface, their gibbing holds slide and bed in precise alignment for precise production, longer periods between die grinds, and longest possible die life.

But this just begins to tell the story . . .

YOU'RE INVITED TO CHECK all the features of these production-boosting machines. Illustrated Bulletins 54 (Series M), 56 (Series E), and 264 (Series SA-2), will be mailed on request. Write: Niagara Machine & Tool Works, Buffalo 11, N.Y.

NIAGARA

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

If you have anything to do with plant

take a good look at

Chances are you can get better lubrication... and save money in the bargain

To many people grease is an unglamorous and confusing subject. This is a shame, because grease is really a spectacular sort of lubricant. Nevertheless, people who don't understand it tend to forget it.

As a result, they run into all sorts of trouble. Sometimes they spend too much, buy the wrong thing, or misapply what they do buy. Sometimes they neglect to apply it at all.

True, a few years back, greases could be a headache, principally because in many cases the "right" grease simply didn't exist. To handle some of the tougher jobs grease-makers came up with the weirdest sort of concoctions. No wonder people put grease in the product-to-be-forgotten class.

But times have changed.

Grease-makers have found out a lot. They're making *better* products . . . and Sun's among the leaders in producing a full line of modern maintenance greases.

WHAT IS A GREASE?

It always pays to be sure you know what you're talking about. At least, asking such an academic question may bring to light some worthwhile points you've forgotten. Simply, a grease is a thickened oil.

By his choice of thickener, a grease-maker can make a grease with high resistance to water, to high temperatures, or to both. By using additives and inhibitors he can get certain special properties, such as tackiness, high resistance to deterioration, and so on.

You might think of the thickener as a sponge that sops up oil, thus providing a means of keeping an oil *on the job*.

Greases come into their own wherever it's hard to keep oil where it belongs, or where it's impracticable to keep replacing oil that runs away.

You can't make a good grease with crankcase drainings. You must *start* with a very carefully chosen high-quality oil. The better oil makes the better grease.

WHAT MAINTENANCE GREASES ARE AVAILABLE?

There are several principal types: The work horses, made with calcium and sodium soaps, and the glamour greases, usually made with lithium soaps, and sometimes with other soaps or other kinds of thickeners.

Most greases come in several consistencies, or "thicknesses". How they stack up is best explained in the simple chart below.

WHAT ABOUT A SINGLE MULTIPURPOSE GREASE?

Despite what you may have been told, there is no such product. That is, there is no *single* consistency of a *single* type of grease that can handle *every* operating condition. This is the unvarnished truth.

		Handle Water?	OK For High Temperatures?	What Speeds & Loads?	Relative Cost
THE WORK HORSES	Calcium Soap Grease	YES	NO	ANY	LOW
	Sodium Soap Grease	NO	YES	ANY	LOW
THE GLAMOUR GREASES	Lithium Soap Greases & Others	YES	YES	ANY	HIGH

lubrication . . .

what's happened to grease

HOW TO MAKE UP YOUR OWN MIND

You're in luck here. Modern greasemakers are just as eager as you are to cash in on simplicity. So they're cutting down the number of greases they offer, and this makes grease selection simpler for you.

You can start yourself on the way to grease modernization by asking yourself just a few easy questions:

What do I want the most?

- Good lubrication?
- The economy of simplification?
- The economy of low initial costs?
- Or some combination of these?

Of course you want good lubrication. And this is *always* available, because today, somebody, somewhere, has the grease that will stand up to whatever working conditions you've got to handle. The grease you need exists.

So now you're down to the remaining questions: Simplification? Low initial cost? Or a combination? The chart at the bottom of this page tells the story.

HOW MUCH SIMPLIFICATION?

Sometimes you can simplify yourself into spending *more* money, not less. Just the same, most people buy too many greases.

Many plants can do quite well with a single maintenance grease. This is hard for many people to believe. But it can be done, economically, in an amazing number of plants. Yours may be one of these. Many plants, of course, need two or three greases, but rarely any more.

When you're simplifying, the trick's in knowing when to stop.

THE VITAL LAST STEP

Now . . . you need to go only one step farther: You need to find *products* that will handle *your* needs.

And you need *savvy*, to analyze your needs, to pick the best product mix, and to apply wisely the products you buy.

Again the answer's simple. Sun has the *products* and the *savvy*. If you're really interested in getting the most out of grease, your Sun man can help you. Call him. Put the challenge to him. Call him today and tell him that you want to talk grease.

TECHNICAL BULLETIN

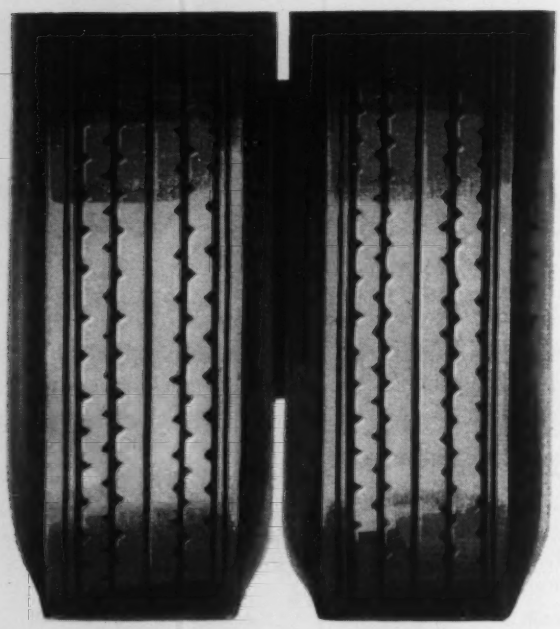
If you're not disposed to talk, then you should ask for Sun's new Technical Bulletin 69. It gives complete information on all of the basic types of maintenance greases in a comprehensive, orderly fashion, and lists full details on the major greases Sun makes.

For your copy write to:

SUN OIL COMPANY, Dept. S-11, 1608 WALNUT STREET, PHILADELPHIA 3, PENNSYLVANIA.

In Canada: Sun Oil Company Limited, Toronto and Montreal. Or call the Sun representative located nearest you.

	Relative Grease Costs	Storage & Handling Costs	Chances of Failure Through Misapplication	REMARKS
Simplification?	HIGH	LOW	LOWEST	Usually, you'll need a glamour grease or two, and this will increase grease costs. This is not necessarily true in plants with narrow ranges of operating conditions or where you don't need one grease to handle, for example, high temperatures and water. In these cases you can often achieve simplicity by using one or two modern calcium or sodium greases in place of half a dozen.
Low initial costs?	LOW	HIGH	HIGHEST	When you have no condition that requires glamour greases, you can use moderate-cost calcium and sodium greases. This keeps grease costs down, but they can be overbalanced by higher storage and handling costs. Failures from misapplication are also more likely.
Combination of simplification and low initial cost?	MODERATE	MODERATE	MODERATE	Just about always the best solution. The bigger the plant, the more varied the needs, the more important a compromise becomes. Of the three, this is the hardest course to chart; to follow it wisely, expert advice is a must.



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Good weighing builds good will—and bigger profits.

Our exclusive Type "S" Truck Scales are famous for accuracy, low maintenance, best load distribution, and minimum installation requirements. They provide greater protection to pivots and bearings under massive loads and sudden stops.

Each Fairbanks-Morse Type "S" Truck Scale is extremely accurate. High-tensile-cast, one piece levers prevent warping, failure, corrosion due to damp scale pits. Exclusive Type "S" design provides super strength, better weight transmission, and protection for sharp knife edges. All parts, including pivots and bearings, are completely interchangeable.

Each Fairbanks-Morse Type "S" Truck Scale is expandable —for longer trucks and larger payloads.

You have a choice of indicators, either Beam type—or our exclusive, swiveling "Floaxial" Dial for fully automatic read-outs!

F-M Type "S" Truck Scales range in capacities from 10 to 100 tons and higher. Platform sizes from 18' x 9' up to any size required for the weighing of vehicles according to legal limits. Optional accessories include: double face dial; Printomatic for accurate, trouble-free weight recording; and type-registering weighbeam, etc.

For further information, write: Dept. S-1; Scale Division; Fairbanks, Morse & Co.; 100 Electra Lane, East Station; Yonkers, New York.

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FALK STEELFLEX COUPLINGS
for industrial applications...large or small

Giant Falk Coupling smooths out steel blooming mill performance

On a blooming mill at the Copperweld Steel Company plant in Warren, Ohio, installation of a large Falk Steelflex coupling between motor and pinion stand eliminated troublesome noise and vibration which threatened to damage mill machinery. Transmitting 5,000 hp at 50/100 rpm, this is not the largest Falk coupling... others are designed to transmit up to 130,000 hp at 100 rpm.

This installation and others like it prove the Falk concept of shaft coupling design—namely, a modern shaft coupling must contribute to the successful performance of the machinery system.

What does this mean to you? Just this: On large machines as well as small, the exclusive Falk grid-groove design does make a difference, and the difference is torsional resiliency with the strength of steel...reason enough to specify Falk Steelflex couplings as "long life" insurance for your connected machinery.

Falk Steelflex couplings are available in standard designs in 34 sizes for applications from .3 hp at 100 rpm to 130,000 hp at 100 rpm, with excellent delivery. Write for Bulletin 4100.

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MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

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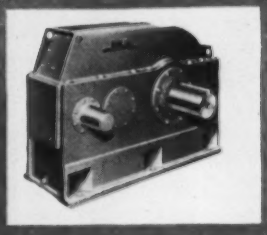
A Point to Ponder... When you need gear drives or shaft couplings of "FALK OR EQUAL" quality, where but from Falk can you get the "OR EQUAL"?

Other members of America's First Family of Power Transmission Products



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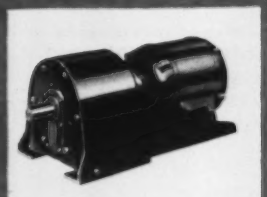
Parallel Shaft up to 3500 hp. Ask for Bulletin 1100. Also Right Angle and Concentric Shaft designs.



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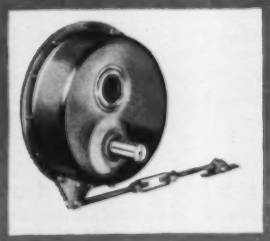
—up to 75 hp. Horizontal, Vertical, and Right Angle. All-Motor and Integral Types. Ask for Bulletin 3100.



SHAFT MOUNTED DRIVES
—up to 125 hp. Ask for Bulletin 7100. Also Flange Mounted and Screw Conveyor Drives.

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The "cool" abrasive vital to ultrasonic machining . . .

NORBIDE* boron carbide

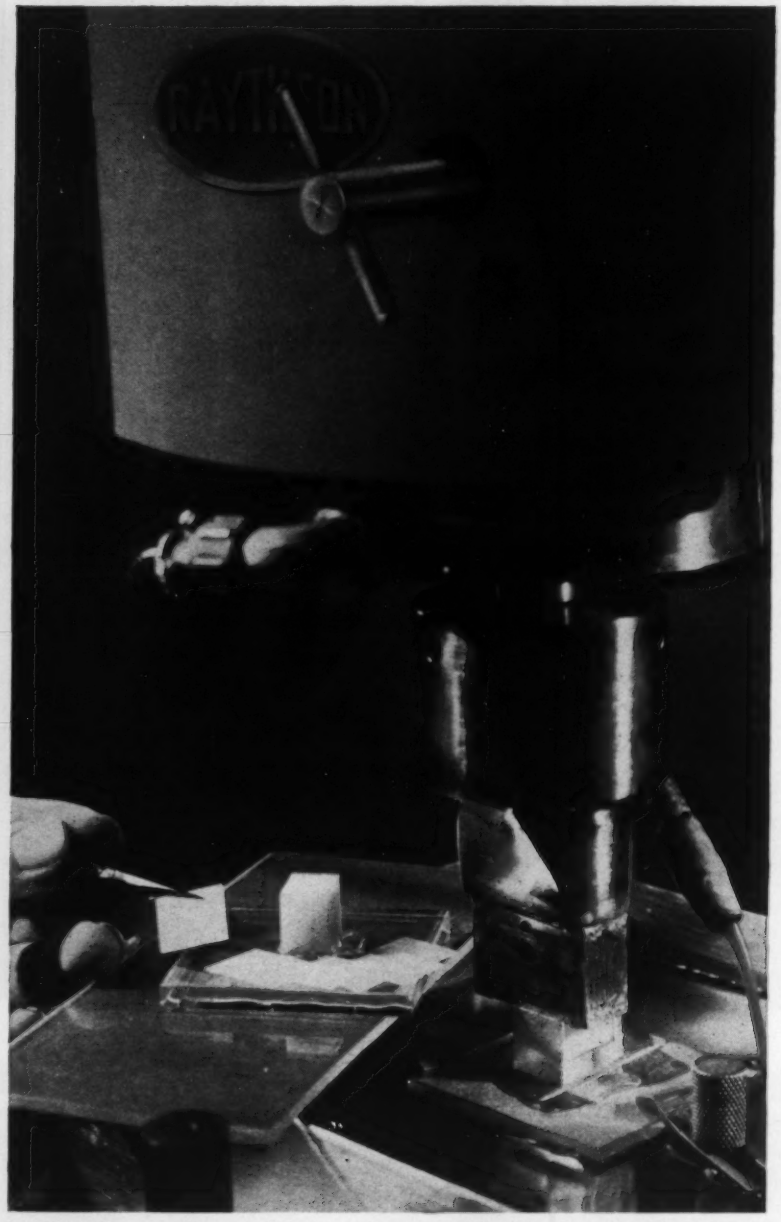
The Raytheon Company, a leading manufacturer of ultrasonic impact grinders defines the ultrasonic process as including:

. . . "*mechanical vibration at 25,000 cycles per second, above the range of the human ear . . . amplified and transmitted to the cutting tool . . . Tiny particles of abrasive are accelerated . . . and driven with tremendous impact against the work, thereby chipping or grinding an exact counterpart of the tool face into the work . . . This . . . together with the vibrating nature of the process, plus the absence of direct tool-to-work contact and the presence of the cool abrasive, make impact grinding a cool-cutting process. The work material is not stressed or distorted in any way, and is not raised in temperature.*"

Recommended by Raytheon, Norton NORBIDE boron carbide is the ideal cool-cutting abrasive for ultrasonic grinding and machining.

Always recognized as second only to diamonds in hardness, and as much more suitable for ultrasonic impact than silicon carbide grain, this Norton achievement has been recently improved to even higher effectiveness.

And now, improved NORBIDE boron carbide has greater freedom from impurities — which assures greater, longer lasting cutting power in each ounce of grain.



Raytheon Ultrasonic Impact Grinders are widely used for slicing of semiconductor wafers, as shown, and in later dicing of the wafers. Other machining operations include drilling, engraving, broaching, trepanning, shaping, shaving, lapping etc. Driven against the work with an impact force of 150,000 times its own weight, NORBIDE boron carbide grain is recommended by the Raytheon Company as the "cool" abrasive that meets every requirement for high precision, trouble-free cutting action.

Your Norton Man will be glad to tell you how ultrasonic machining is opening up new potentialities in many manufacturing fields, applied to a variety of materials — and how improved NORBIDE boron carbide can benefit your own operations in this modern field. See your Norton Distributor or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

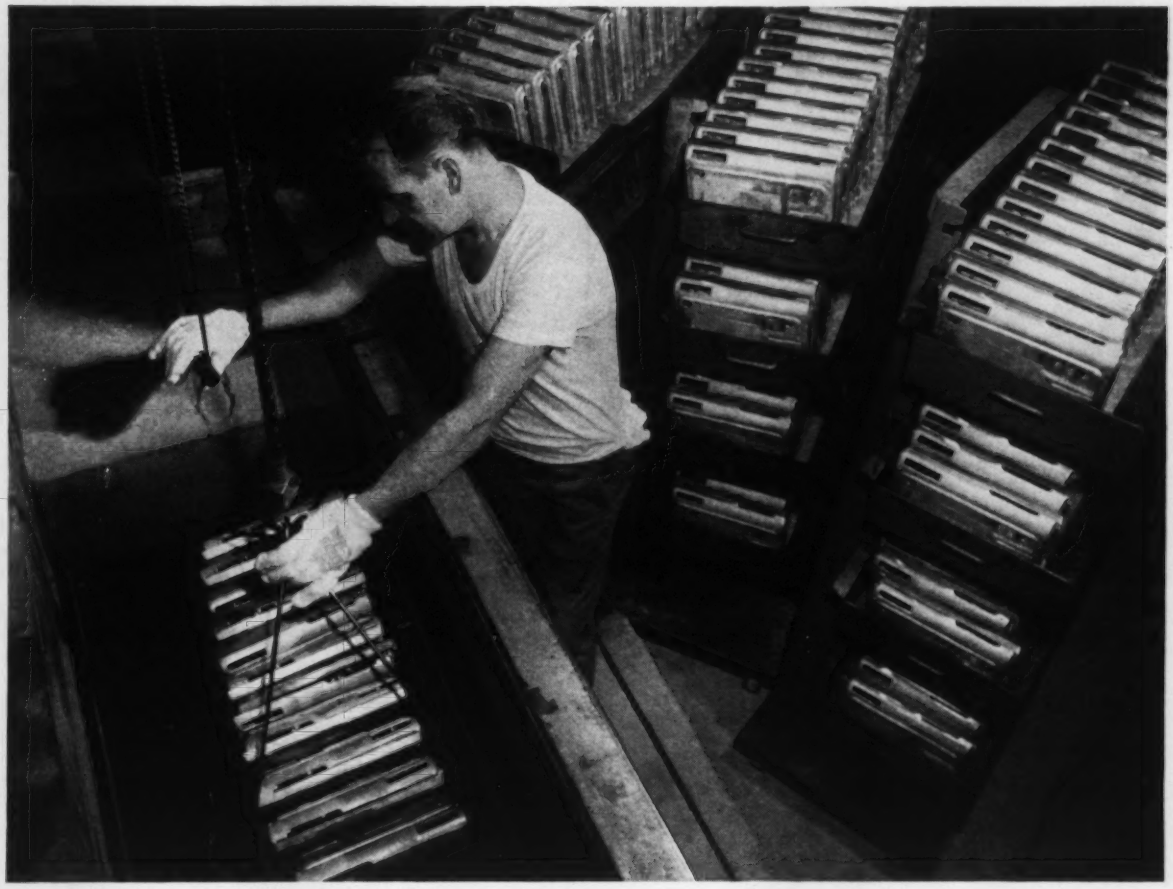
G-415

NORTON
BORON CARBIDE

*Trade Mark Reg. U.S. Pat. Off. and Foreign Countries.

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories — Non-Slip Floors — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



HOW VOICEWRITER CUTS DEGREASING TIME UP TO 50%

... and cleans parts spotlessly every time

Nearly every metal part on an Edison Voicewriter requires machining. "Since absolutely clean metal components are essential to the smooth operation of these fine machines," says Robert Spears, Voicewriter's factory superintendent, "we have to use a dependable degreasing solvent." Nialk® TRICHLORethylene is the one they've used for years.

"It's stable and safe," Mr. Spears says, "and certainly economical and efficient." He explained that only one degreasing in Hooker TRICHLOR is necessary, while many other types of cleaners require two. Degreasing time is perhaps one-half what it would be with another type of cleaner.

Even more important, according to Mr. Spears, is that Hooker TRICHLOR removes all soils *definitely*. There are no hidden pockets of dirt or grease to be picked up as rejects by inspectors or at the paint shop.

A specific property of Hooker TRICHLOR that particularly benefits Voicewriter production is its unique neutral stabilizer system. Since virtually all the metal parts on the Voicewriter are aluminum, it's important to see to it that the solvent doesn't turn acid. Hooker TRICHLOR satifies that requirement particularly well because the stabilizer has *psp*—permanent staying power.

Both degreasers at the Voicewriter plant are *original* equipment, indicating that the use of Hooker TRICHLOR has had no deleterious effect on the degreasers. One degreaser has been in service 20 years, the other 15 years—with no replacement needed or anticipated.

Whatever your metal, whatever your degreasing job, you can solve your cleaning problem with Nialk TRICHLOR. See your chemical distributor or drop us a line. Hooker experience is yours for the asking.

HOOKER CHEMICAL CORPORATION

1211 UNION STREET, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

General Electric Makes Eddy-current-coupling Drives

And they're dependable drives. The complete line includes water-cooled and air-cooled eddy-current couplings. We call them KINATROL* drives. Ratings are from 1 to 150 horsepower, operating from standard a-c power.

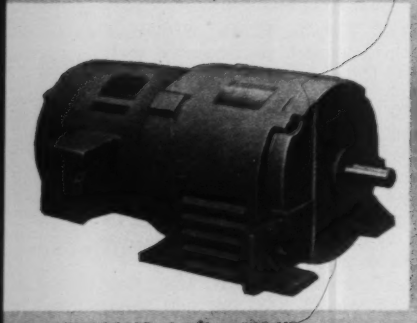
A General Electric KINATROL drive is not just another eddy-current coupling. For instance, in the water-cooled coupling, water control is packaged. You'll see much less external piping. Furthermore, the coupling is protected from flooding—and the air gaps are dry, preventing corrosion.

KINATROL couplings are compact, field proven and dependable. General Electric has had a good deal of experience in the engineering, manufacturing, and application of packaged adjustable-speed drives. And we know how important service is to a customer.

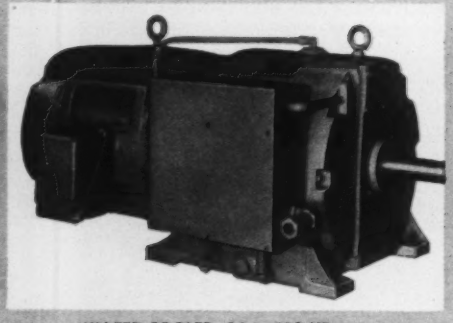
KINATROL —a good product, with the kind of service you can depend on. Please call your nearest General Electric Sales Office for further details.

*Trademark of General Electric Company

821-07A



AIR COOLED, 7-1/2 to 100 HP



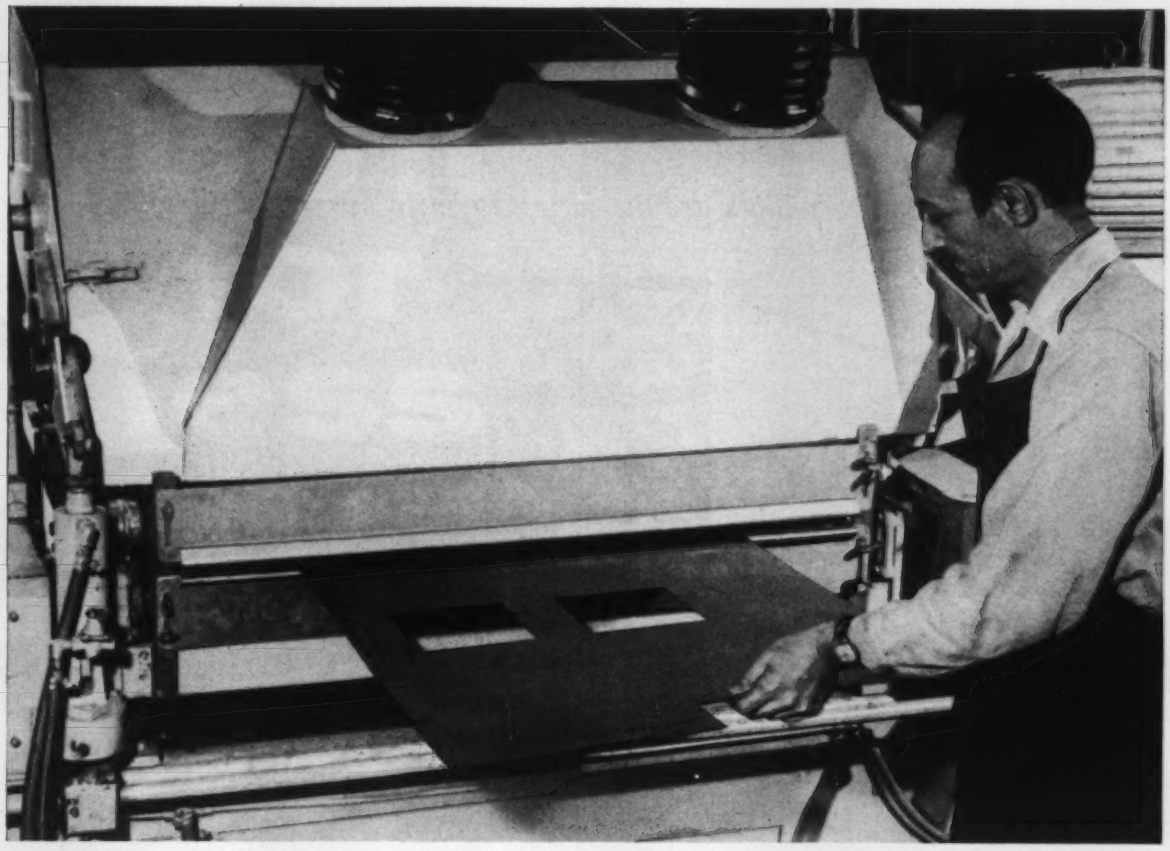
WATER COOLED, 25 to 150 HP

AIR COOLED, 1 to 5 HP

DIRECT CURRENT MOTOR AND GENERATOR DEPARTMENT

GENERAL ELECTRIC

ERIE, PENNSYLVANIA



3M Abrasives Help AMF Reduce Sheet Metal Deburring Costs

Innumerable ferrous and non-ferrous sheet metal components are manufactured for cigarette, cigar, bakery, and Automatic Pinspotter Machines at the American Machine & Foundry's Brooklyn, New York plant. Sheared to size and punched, components must then be deburred and cleaned prior to painting and plating. The previous method, using abrasive discs, often left swirl marks which had to be removed in a secondary hand sanding operation at extra cost.

As the result of a recommendation from a 3M Representative, AMF switched to the use of a wide-belt sander and "Three-M-ite" Resinbond Cloth Belts on these operations.

The results were remarkable. The new wide-belt prefinishing method eliminated all extra re-work, provided a better pre-paint surface, and cut unit costs substantially. Unit production time was slashed from more than 9 minutes to less than 30 seconds.

Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase profits. Discover . . .

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form *without obligation*. Put 3M's years of abrasive know-how at your disposal.

3M Coated Abrasives

SEND IN TODAY

3M COMPANY, Dept. ABH-111
900 Bush Ave., St. Paul 6, Minn.
Send me my Free COST CHECK 5-4-5 Kit

COST CHECK 5-4-5

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

"3M" AND "THREE-M-ITE" ARE REGISTERED TRADEMARKS OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO.

Now, the strongest bridges are the fastest to build because they're . . .

GUARDED BY GALVANIZED STEEL

Galvanized steel sheeting—long used for permanent concrete forms in building construction—has now been adapted to do the same job for bridge engineers and with remarkable success.

On bridges and their approaches, a heavier gauge sheet is used with deepened corrugations for added strength. This new form assembly is not only strong enough to support heavy concrete slabs, but installation takes only half the time required by other types of form work.

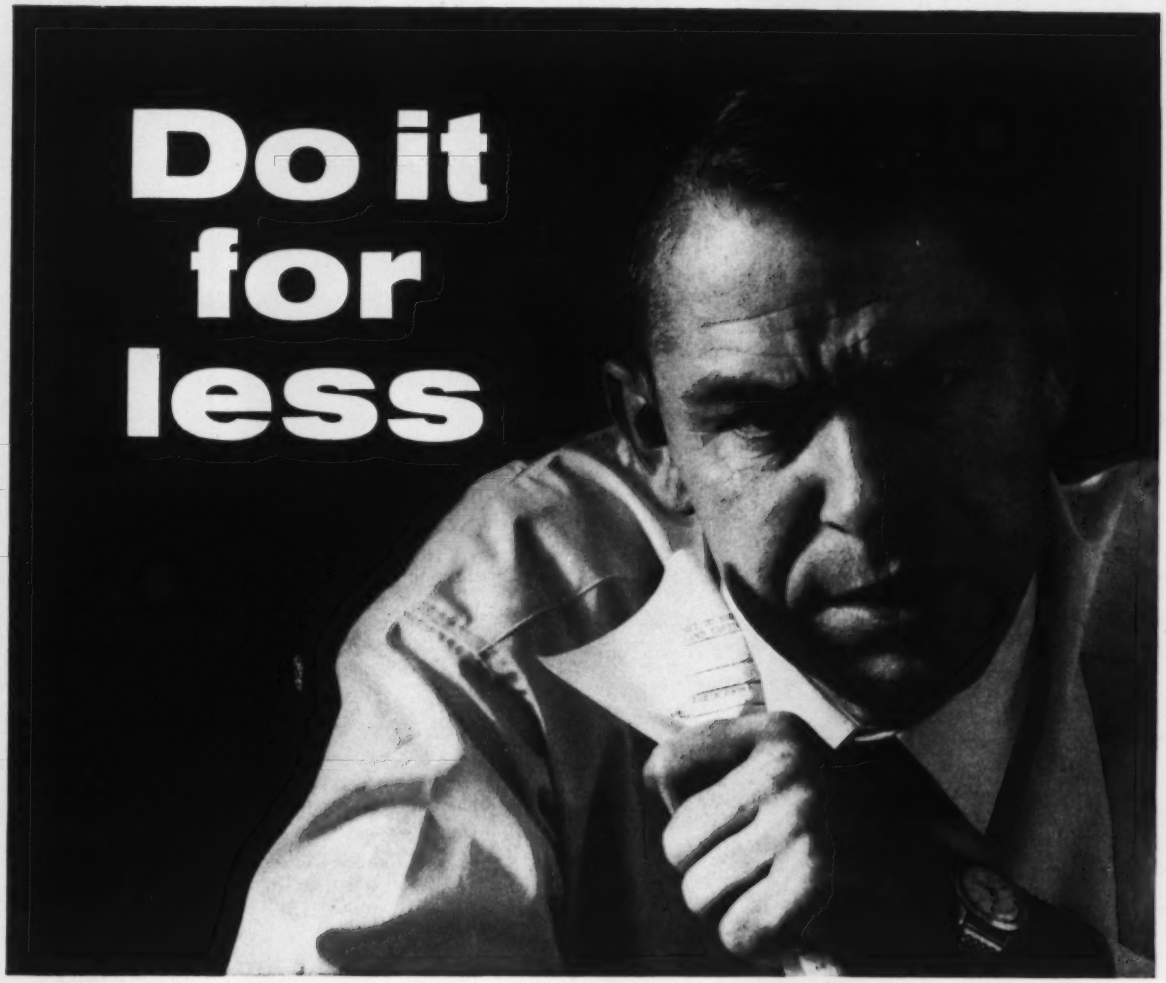
The strength and excellent corrosion resistance of galvanized steel is also winning increasing acceptance in a wide variety of architectural uses as well as in other areas of highway construction, such as culverts and guard rails.

WEIRKOTE® IN PARTICULAR is one galvanized steel that's especially well suited to all these applications. Made by the modern continuous process, it can be worked to the very limits of its steel base without losing even a chip of its zinc protection. Weirkote is made by two National Steel divisions: Weirton Steel and Midwest Steel. For further details, write to Weirton Steel Company, Weirton, West Virginia.

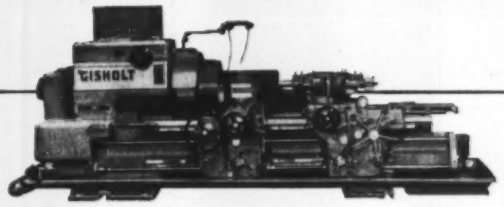
MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

Divisions of
NATIONAL STEEL CORPORATION



ON A GISHOLT SADDLE TYPE TURRET LATHE



Gisholt MASTERLINE 3L
Saddle Type Turret Lathe

Offers Maximum Operator Ease.

Speed selector for 12 or 24 spindle speeds.

Separate lever controls for cross and longitudinal rapid traverse.

With cross-feeding hex turret, standard tools handle all types of machining.

JETracer (for cross slide, cross-feeding hex turret, or mounted on turret face) handles tapers, contours, steps and combination forms automatically.

Call your Gisholt Representative or write for literature.

This man has just lost an order because his turret lathes couldn't compete. Yet, they are *only* ten years old . . . as are over 65% of the machines in use today.

With all the talk about tape control, it's easy to forget that even the standard turret lathe has changed. It's 40% more efficient than it was ten years ago. Many skilled manual operations can now be done automatically. *You* could rely on *fewer* machines and save time, floor space, reduce tooling and maintenance costs, and skilled labor requirements!

If you have ten-year-old's in your shop, it's time to act. Find out what the new Gisholt Turret Lathes can do for you.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

Plants grow better beside water

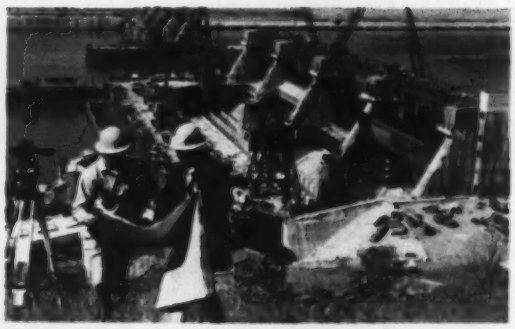
That's because an abundance of water is necessary for plant life. And those that have their roots at the water's edge can devote full attention to the problems of productivity.

Since 1953, more than 3,000 new plants have located on the Mississippi River System alone, not to mention the Great Lakes, the Gulf and numerous other rivers. Why? Mostly it is a matter of the "cost of living." Process water and plant utilities can be obtained economically; raw materials and finished products can be moved in and out at low cost.

If you are considering a waterside location, or plan to expand or modernize an existing plant, you are invited to call on Dravo's 60 years' experience in and around water. Work has been performed for the U.S. Army Corps of Engineers in every one of the past 60 years, including many lock and dam projects in the continuing program for improvement of the country's inland waterways system. Another activity is production and marketing of river sand and gravel. Hundreds of industrial plants are served by Dravo-built docks. Ships and barges laden with ore, coal, bauxite and other bulk cargo are unloaded by Dravo materials handling equipment.

Pumphouses and water intakes, water and waste treatment facilities, steam or power generating plants, fabricated piping are also company specialties. Towboats, tugboats and barges launched at the Pittsburgh or Wilmington shipyards move almost every type of water-borne commodity. A subsidiary, Union Barge Line, offers common-carrier and contract transportation service on the Mississippi River System and Gulf Intracoastal Waterway.

The coupon can be used to obtain more information on these activities.



Marine construction experience includes giant dam and lock projects—commercial installations of all kinds.

Twin high-speed river towboats built for a New Orleans transportation company.

A Union Barge Line tow carries products of many industries.

Generating station, dock and unloader built on turn-key basis.

A covered hopper barge is launched at Neville Island shipyard.

Dravo Corporation, 4790 Grand Avenue, Pittsburgh 25, Pa.

Please send me information on the following products and services:

☐ Pumping Stations & Intakes	☐ Oxygen Steelmaking	☐ Steam & Power Plants
☐ Sewage & Water Treatment	☐ Ore Bridges	☐ Towboats & Barges
☐ Coal & Ore Unloaders	☐ Shafts, Slopes	☐ Fabricated Piping
☐ River Transportation	☐ Grating	☐ Container Cranes
☐ Sintering & Pelletizing Plants	☐ Space Heaters	☐ Compressor Stations
☐ Docks, Harbors, Foundations	☐ Oxygen Plants	☐ Process Machinery
☐		

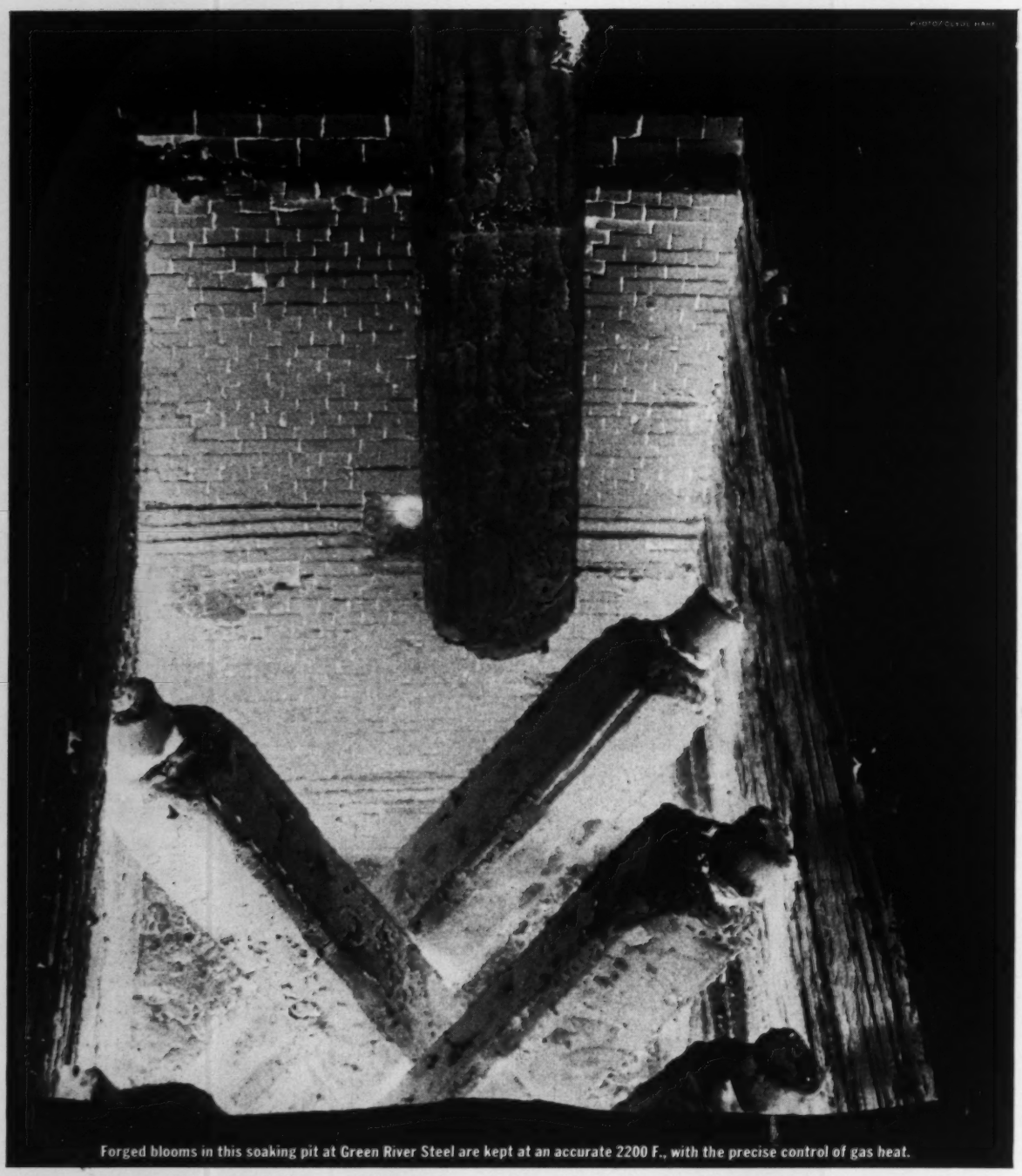
Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

DRAVO



Forged blooms in this soaking pit at Green River Steel are kept at an accurate 2200 F., with the precise control of gas heat.

Green River Steel relies on GAS for precise control of critical heats. At Owensboro, Kentucky, Green River Steel Corporation, subsidiary of Jessop Steel, produces clean, fine-grain alloy steels. For quality control in heat processing this producer relies on the precise control and uniform heat of gas. ☐ Gas preheats ingots to maintain critical temperatures for rolling. Gas gives instant, accurate heat in Green River's 4 reheating furnaces and 8 soaking pits. The entire operation is more profitable because of the unbeatable economy of gas. ☐ You can upgrade heat processing, keep costs down with the precise control, speed, cleanliness, economy and dependability of gas. Call the Industrial Sales Engineer at your local Gas Company.

American Gas Association **FOR HEAT PROCESSING...GAS IS GOOD BUSINESS!**

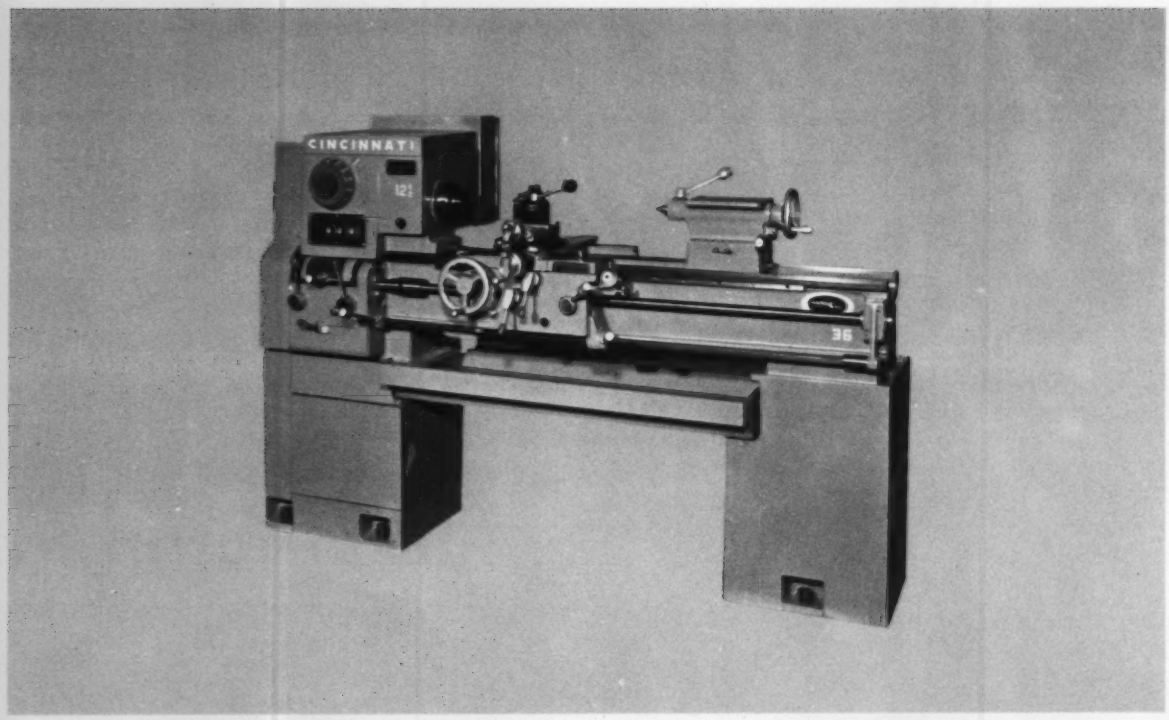
Pre-selected speeds finish lathe jobs in half the time

Development and production schedules at Moog Servocontrols, Inc. don't allow for waste motion. That's one reason why this manufacturer is enthusiastic about the 15-inch Cincinnati HYDRASHIFT lathe recently installed at the Paramus, N.J., Research Laboratory. Pre-selected speed shifting puts the machine one step ahead of each operation, ready to start the next without delay.

A typical job for the HYDRASHIFT at Moog is machining prototype injector housings from three-inch stainless steel bars. Formerly, the bars were blanked into work pieces on a bandsaw, but the HYDRASHIFT lathe now takes these heavy initial cuts in stride. Time saved on this first operation alone is at least two thirds. For all machining—which includes five speed changes and a tool change—the HYDRASHIFT requires only half as much time as the old method.

Cincinnati Lathe and Tool Co. builds HYDRASHIFT lathes in six sizes, from 10-inch to 26-inch, with a broad selection of horsepower ratings, spindle speeds, feed ranges, swing sizes and bed lengths to suit any application. For more information on details and specifications, turn the page.

CINCINNATI



HYDRASHIFT LATHES INCLUDE . . .

types:	Engine, toolroom, raised head, tracer models (10″, 12½″, 15″, 18″, 21½″, 26″)
horsepower:	3 to 10
swings over bed:	11½″ to 35″
swings over cross slide:	6¾″ to 27¾″
bed lengths:	24″ to 216″
speed ranges:	11 to 3000 RPM
feed ranges:	.0009″ to .1224″
thread ranges:	1½ to 368 TPI

Priced in the light duty class . . . Hydrashift lathes provide the potential to handle a much wider range of work.

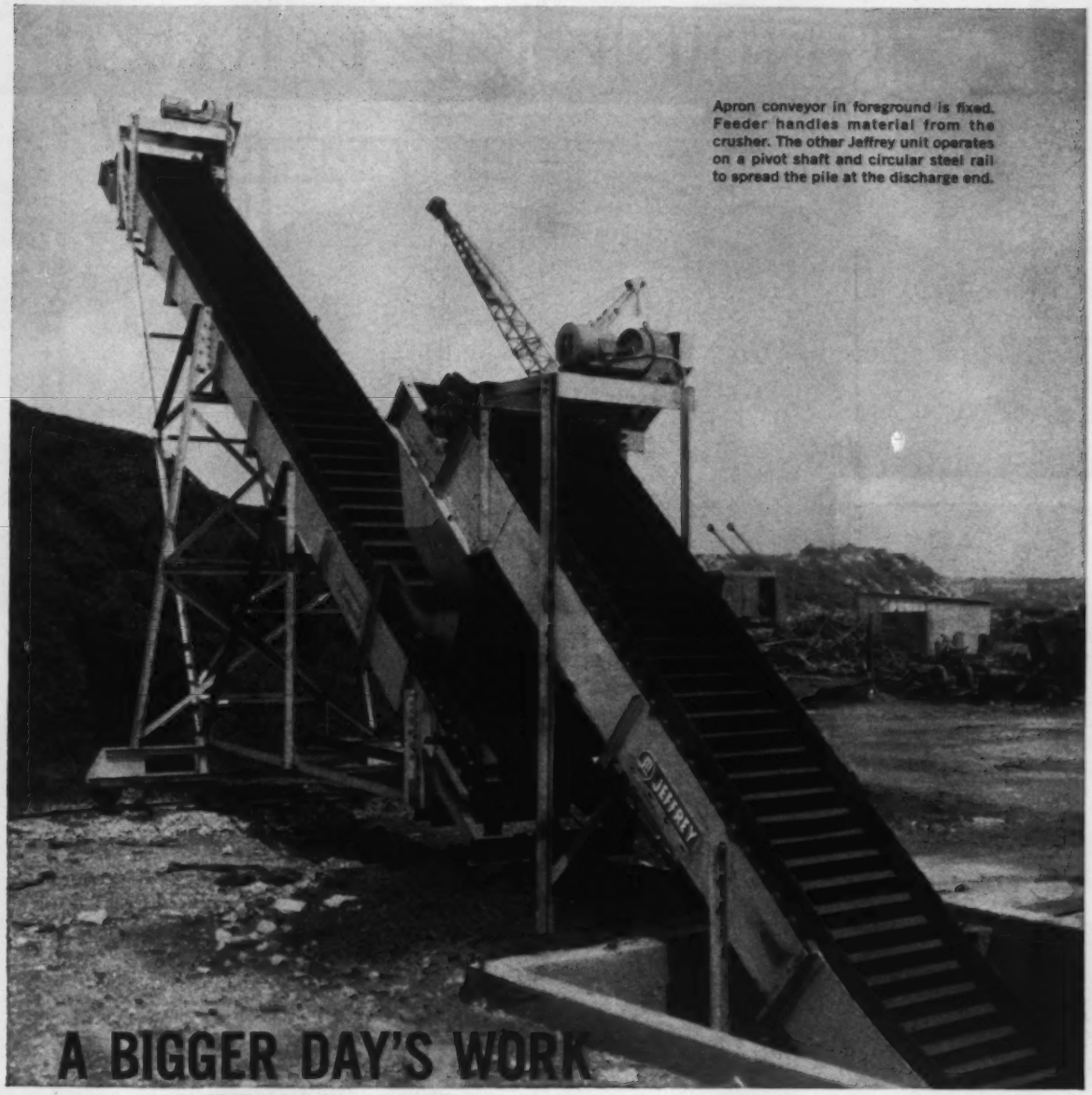
CINCINNATI

hydrashift speed shifting

Pre-selective speed shifting keeps the machine cutting more of the time—avoids waste motion and reduces operator fatigue. To change spindle speeds, the operator merely rotates the direct-reading speed control dial to the desired RPM—pre-selects his next speed *while the lathe is taking a cut!*

To shift speeds, the operator simply lowers the spindle start-stop lever to the brake position, then returns it to run position. The shifting is completed through hydraulic power.

Call your Cincinnati Lathe and Tool distributor for complete information. Or write Cincinnati Lathe and Tool Co., subsidiary of The Cincinnati Milling Machine Company, Cincinnati 9, Ohio.



Apron conveyor in foreground is fixed. Feeder handles material from the crusher. The other Jeffrey unit operates on a pivot shaft and circular steel rail to spread the pile at the discharge end.

A BIGGER DAY'S WORK BEGINS WITH JEFFREY CONVEYORS

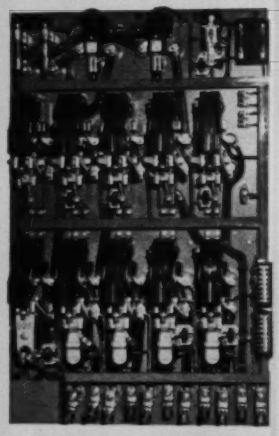
Take Chas. J. King, Inc. of Brooklyn, New York, for example. Two Jeffrey 36″ Hinged Apron Conveyors handle crushed, shovel-size metal turnings—at a rate of 50 tons per hour. The turnings weigh 50 pounds per cubic foot and are transferred at a rate of 60 feet per minute. That's moving—in anyone's language.

The aprons are made of steel flights on Jeffrey STR Chain. Each flight is fitted with a lifting blade. Units come complete with steel frames, chain drives, reducers and 3 hp motors.

Get a bigger day's work! Get the facts on Jeffrey conveying equipment today. Competent engineering facilities and service help assure satisfaction every time. For more information, write for Catalog 980, The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

If it's conveyed, processed or mined, it's a job for Jeffrey

JEFFREY



New smaller Cutler-Hammer Bul. 14115 hoist panel featuring front-wired steel panel construction with new unitized Dc contactors, factory wired to easily accessible terminals, and new panel arrangement with all protective devices at the top.

What's new in control for mill cranes?

New Cutler-Hammer Dc crane control with smaller steel panel construction

Here's the smallest area panel on the market today—made possible by Cutler-Hammer's new, unitized Dc contactors. Front wired steel panel construction provides the ultimate in space savings and ease of maintenance. No access to rear of panel is required—all devices are front removable.

New unitized contactors in six sizes (25, 50, 100, 150, 300, 600 amperes) are surface mounted or elevated with spacers for most efficient utilization of panel space. Epoxy resin impregnated coils are completely protected against moisture and dust. Improved blow-out structure increases contact life. Predrilled mounting holes on insulated steel unit bases accommodate interlock assemblies with field convertible contacts.

Check the simple circuitry of the Cutler-Hammer Bulletin 14111 and 14115 crane control. It provides the ultimate in performance with a minimum number of components.

What's New at Cutler-Hammer?

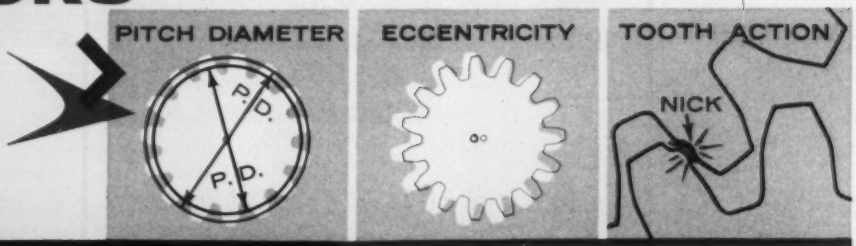
There are many more new and improved products in Cutler-Hammer heavy duty mill control equipment, including the most complete line of mill duty brakes and crane safety limit stops up to 375 hp. For complete details on circuit, mechanical and electrical features, write for Pub. No. LJ-76-X213. Better yet, call your local Cutler-Hammer sales office and ask for a personal rundown on new developments that will improve your crane control.

WHAT'S NEW? ASK...

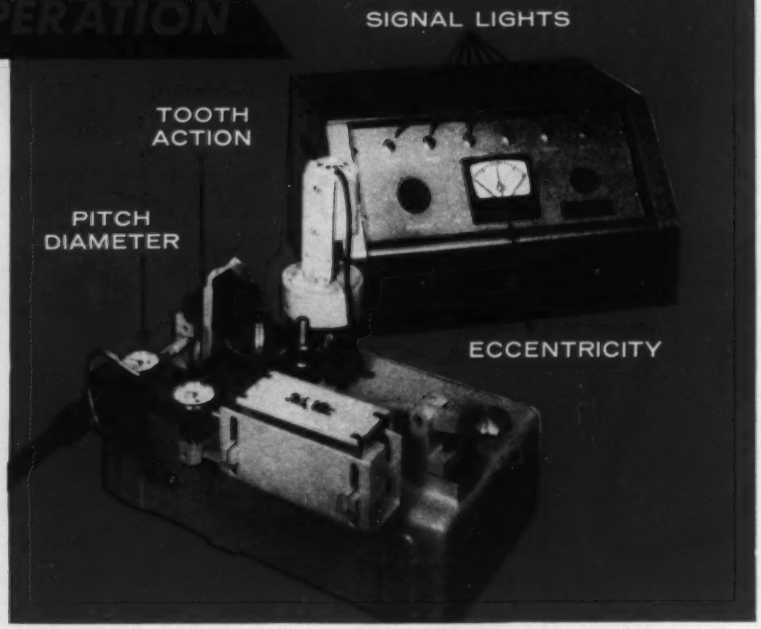
CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Cutler-Hammer Canada, Ltd.; Cutler-Hammer Mexicana, S. A.

CHECK INDIVIDUAL *and* COMPOSITE ERRORS



in just ONE OPERATION



Fussy gear specifications studded with hostile tolerances need no longer foul up your inspection program

now, all readings flash on simultaneously

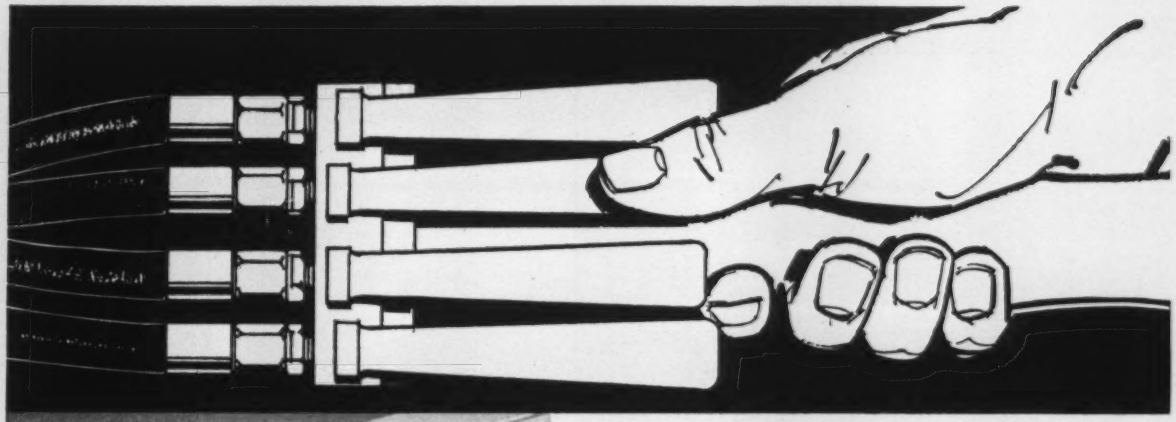
The New Red Ring Inertia Gear Analyzer speeds inspection 80% to 90% over conventional methods— and with laboratory precision

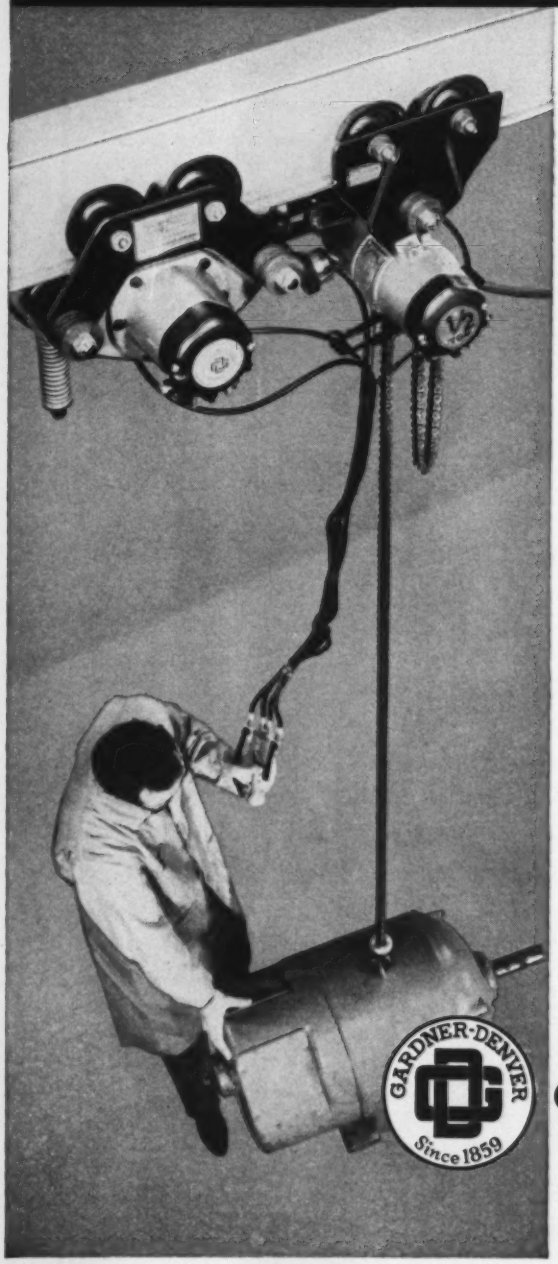
UP TO 500 GEARS PER HOUR

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING, GEAR HONING AND ELLIPTOID

NATIONAL BROACH & MACHINE COMPANY

5600 ST. JEAN • DETROIT 13, MICHIGAN





POWER TEAM ON THE BEAM

Gardner-Denver "Hoistractor"® and air hoist combination teams two-way power to save time and reduce fatigue. Hoist lifts and lowers . . . "Hoistractor" moves hoist and load along the beam. Section 86 and 87 bulletins.

GARDNER-DENVER AIR HOIST AND "HOISTRACTOR"

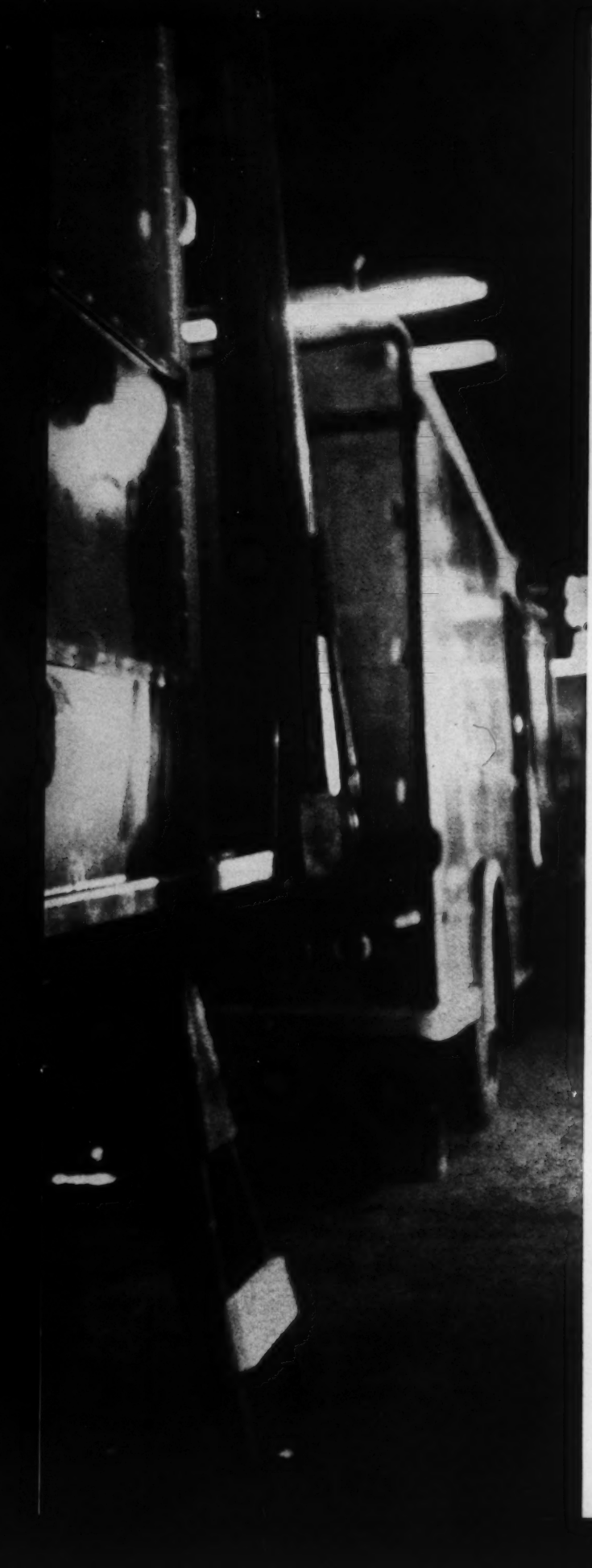
- One-hand control of all movements.
- Air motors can't spark or burn out.
- No damage from overload stalls.
- Protected from dirt, dust, moisture, corrosive fumes.
- Designed for maximum safety.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois—Offices in principal U. S., Canadian and Mexican cities. In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

International: Gardner-Denver International Division, 233 Broadway, New York 7, N. Y. International Offices: Buenos Aires, Argentina; Artarmon, N.S.W. Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal



HOW BOYERTOWN KEEPS EVERY BODY HAPPY

Boyertown Auto Body Works of Boyertown, Pennsylvania is keeping delivery truck owners, drivers and maintenance men especially happy these days by using a new, all-around material in its body construction: J&L Nickel-Copper-Titanium high-strength forming steel.

The owner is pleased because lighter weight means lower operating cost. And Boyertown has been able to save from 600 to 650 pounds over mild steel in a 12-foot forward control delivery body—with no sacrifice of strength!

The driver is satisfied because the increased ductility of J&L Nickel-Copper-Titanium makes it possible for Boyertown to design bodies with greater flexibility—provide more convenience and safety for the man behind the wheel.

The maintenance man is happiest of all. J&L Nickel-Copper-Titanium has a minimum of 4 times the corrosion resistance of mild steel. (For extra protection, Boyertown coats it with rust-inhibiting zinc chromate). It has greater abrasive and impact resistance, and less tendency to dent and wear.

When maintenance is necessary, dents can be easily "bumped out," and repairs are quick and inexpensive.

That's why Boyertown—a pioneer in the use of high-strength steel—continues to specify J&L Nickel-Copper-Titanium for its exterior and interior truck panels, posts, ribs, cross members, floors, doors and windshield assembly. Ask your J&L salesman about J&L's other new high-strength steels, JLX-W Columbium-Bearing and J&L "Cor-Ten."

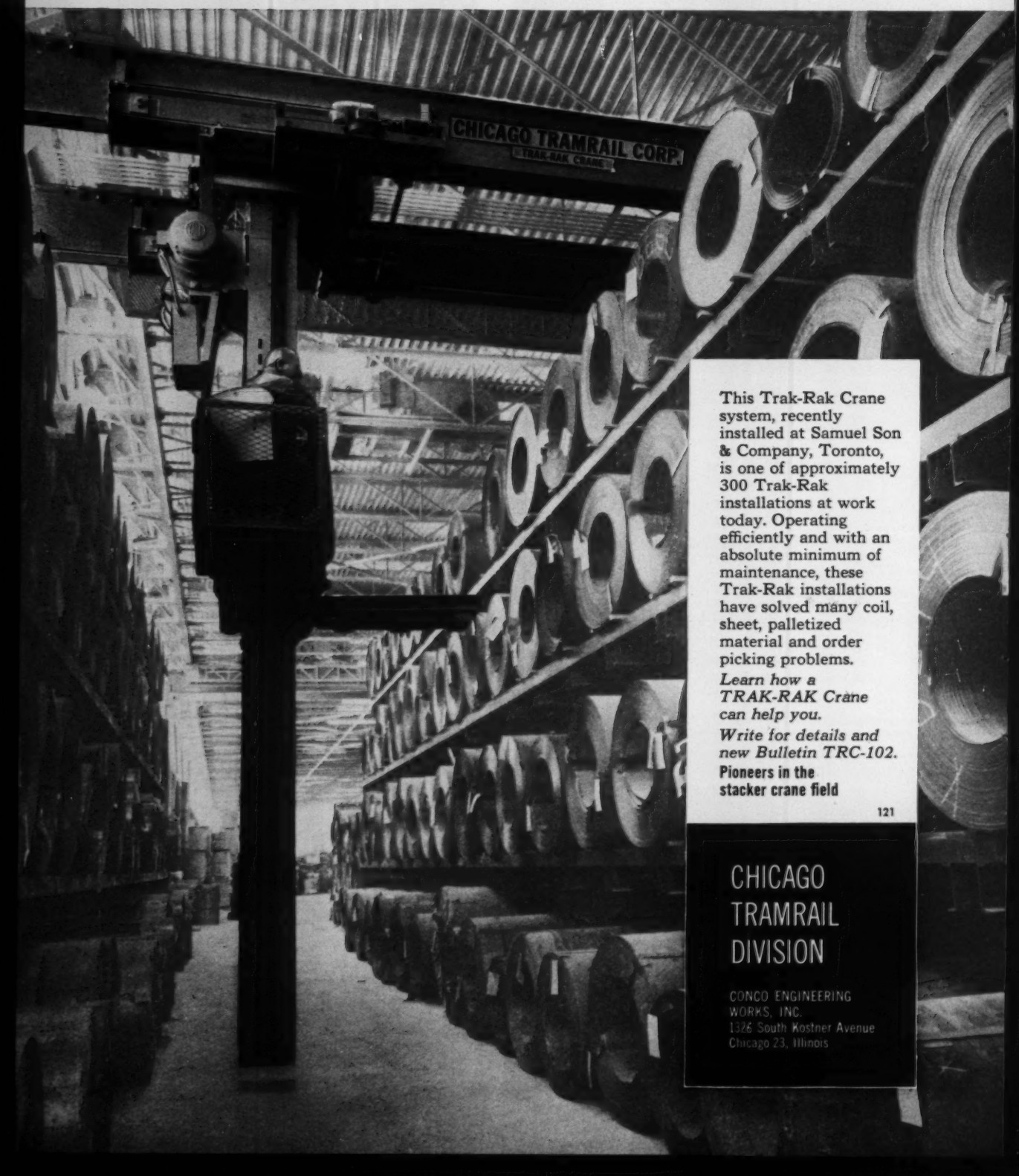
Jones & Laughlin Steel Corporation
3 Gateway Center, Pittsburgh 30, Pennsylvania

J&L STEEL

Handling Coil with a TRAK-RAK CRANE

can bring you:

1. Up to 4 times greater storage capacity in the same area.
2. Manpower savings up to 70%.
3. 100% selectivity.
4. Increased handling speed and safety.
5. Overall reduction in warehousing costs.



This Trak-Rak Crane system, recently installed at Samuel Son & Company, Toronto, is one of approximately 300 Trak-Rak installations at work today. Operating efficiently and with an absolute minimum of maintenance, these Trak-Rak installations have solved many coil, sheet, palletized material and order picking problems.

Learn how a TRAK-RAK Crane can help you.

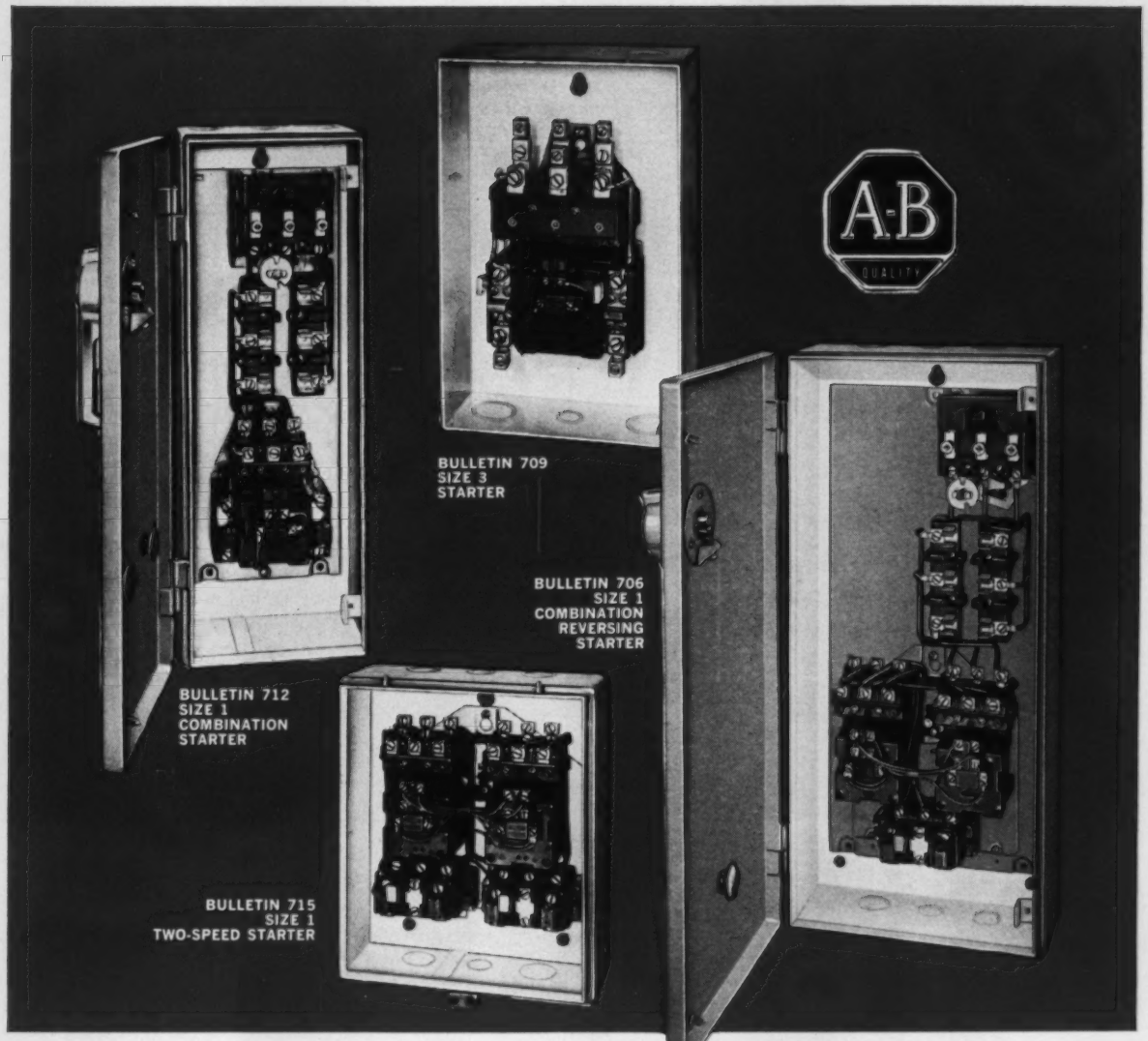
Write for details and new Bulletin TRC-102.

Pioneers in the stacker crane field

121

CHICAGO TRAMRAIL DIVISION

CONCO ENGINEERING WORKS, INC.
1326 South Kostner Avenue
Chicago 23, Illinois



Extra Interrupting Capacity and Extra Life
Give New Allen-Bradley Motor Controls

ALMOST UNBELIEVABLE RELIABILITY

The extra interrupting capacity that's built into these revolutionary new starters enables them to operate with ease at maximum rated capacity for prolonged periods—and still have ample reserve for emergency or unusual operating conditions. As a result, these new Allen-Bradley starters give *almost unbelievable* reliability and long life—a precious benefit for the user!

Where space is a problem, this new line warrants your interest—especially in the Size 2 and higher ratings. You'll find that small size has not been obtained at the sacrifice of "quality" or generous wiring room. In addition to the unmatched performance, you'll be pleased with the modern appearance of the enclosures. Brooks Stevens, world famous industrial designer, has given them the "eye appeal" which spells "quality" to the buyer. Please write today for the full details in Publication 6100: Allen-Bradley Co., 1320 S. Second Street, Milwaukee 4, Wisconsin.

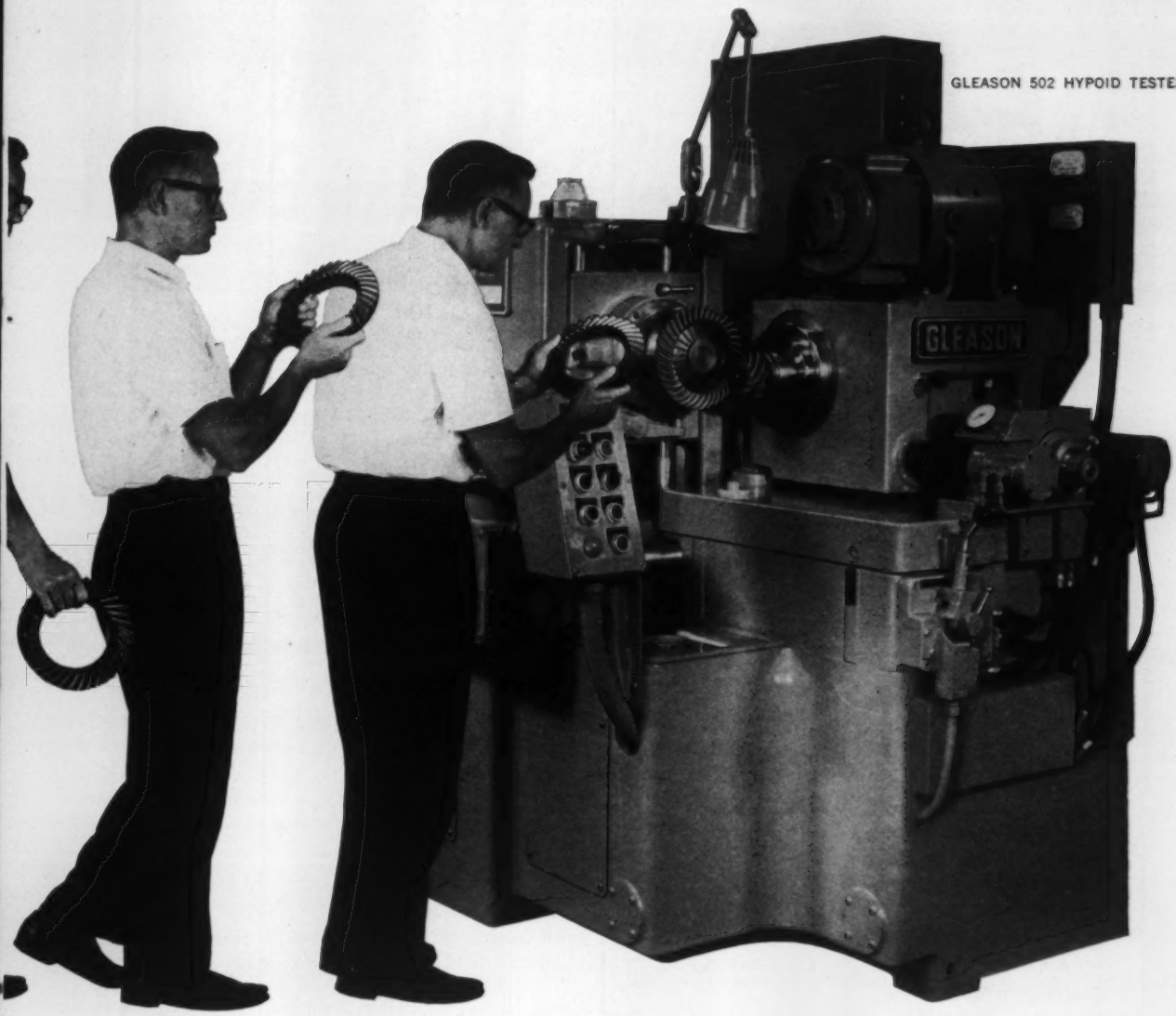
ALLEN-BRADLEY | **Quality Motor Control**

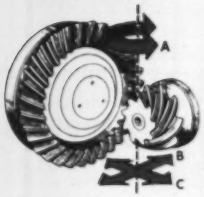
Member of NEMA

GLEASON 503 HYPOID LAPPER

NEW SPC* MOTIONS FOR PRECISION LAPPING AND TESTING

GLEASON 502 HYPOID TESTER





*Swing Pinion Cone lapping motions—the swing motion of the pinion head "A" moves the bearing along the length of the tooth. The axial motion of the pinion head "B" moves the bearing up and down the tooth profile, while the motion of the pinion head in the direction of the gear axis "C" maintains constant backlash.

Designed primarily for testing and lapping automotive spiral bevel and hypoid gears and pinions, these new Gleason machines afford more accurate control than was ever before possible in other machines. The end result —consistent, highly refined tooth surfaces which deliver the ultimate in smooth, quiet running drives.

The Gleason 503 Hypoid Lapper employs an entirely new lapping concept . . . SPC (Swing Pinion Cone). While gear and pinion are rotating together in a flow of lapping compound, the pinion head automatically and continually swings about a vertical axis which passes through the center of the tooth mesh; reciprocates along the pinion axis; and reciprocates along the gear axis. This three-way action laps the entire surface of each tooth from heel to toe. All machine motions and lapping times are separately controlled for drive and coast sides . . . also, machine may be set for extra lapping time at heel or toe if desired. Positive control of backlash, brake load, and lapping motions assure accurate product duplication from machine to machine . . . from job to job. This greater flexibility, combined with the ease of set-up and extreme accuracy of the 503, make it superior to previous lapping machines. The 503 handles gears up to 10½" diameter of any pitch.

The Gleason 502 Hypoid Tester is a companion machine to the 503 Lapper . . . simulates the SPC motions for accurately soft testing, matching, and final testing. Can also be run at spindle speeds up to 4000 rpm to approximate actual vehicle speeds. Handles bevel and hypoid gears up to 10½" O.D.

For full information write Gleason Works, 1000 University Ave., Rochester 3, N. Y.

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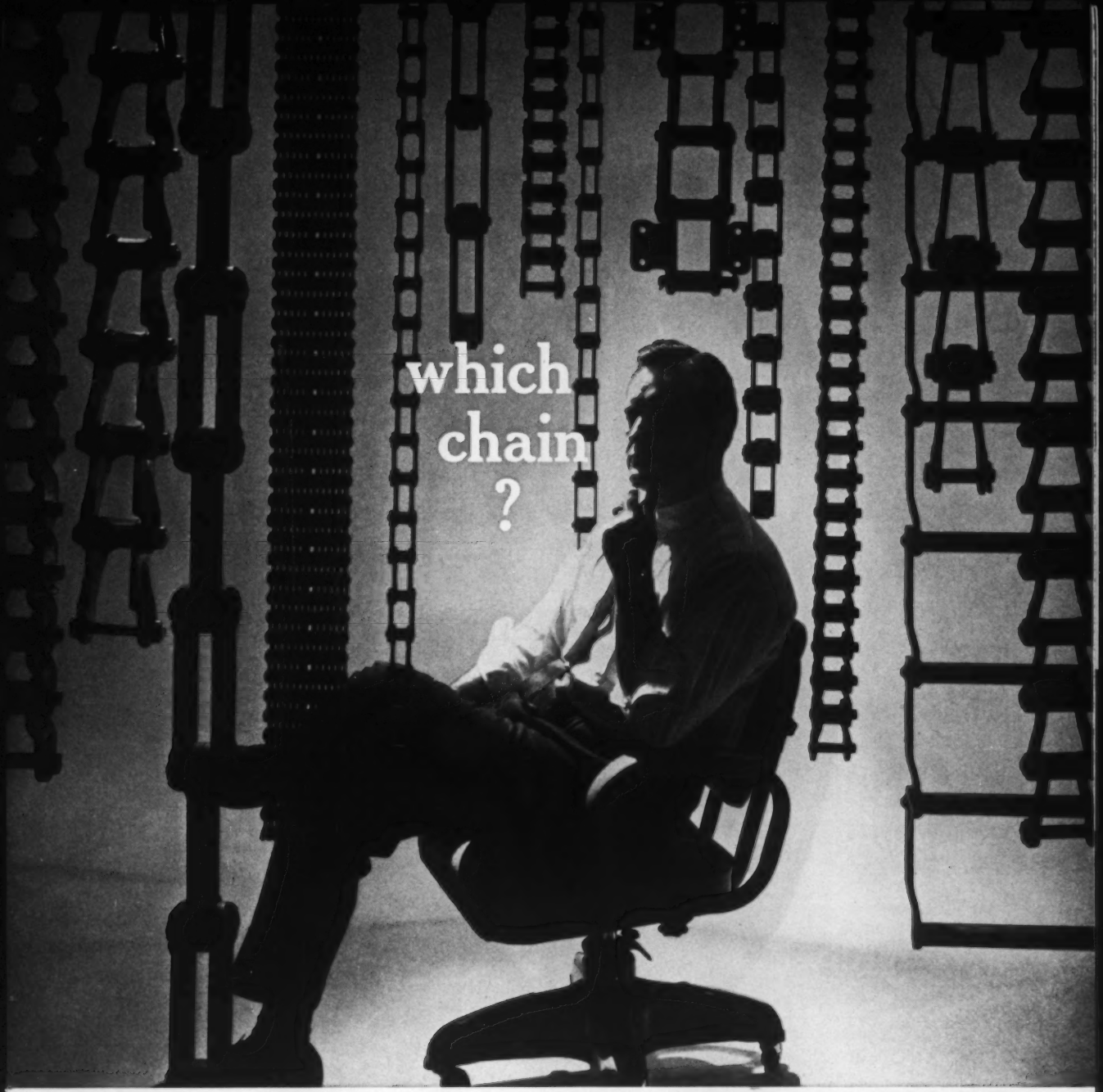

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IS TO START WITH AN ALCO FABRICATED GEAR-BLANK LIKE THIS

ALCO's Hi-Qua-Led Steel® forged and rolled rims now make fabricated gears less expensive than cast gears. Hi-Qua-Led, with lead added by a special process, lowers machining time as much as 50%, extends tool life many times. Costly repairs of casting defects are eliminated. Besides lower cost, you end up with all the advantages of a forged gear—maximum strength, toughness and fatigue resistance. Hi-Qua-Led forged and rolled gear blanks are available in any steel analysis, from 18 to 160 in. OD and to 24 in. wide. For more information write to ALCO Products, Inc., Dept. 1502, Schenectady 1, N.Y.

ALCO **ALCO PRODUCTS, INC.** *Product quality comes first*

NEW McGILL® SEALED CAGEROL® BEARINGS

specially designed
...to extend bearing life

Integral seals which retain lubricant and keep contamination out of critical bearing areas insure the superior performance expected with McGill's exclusive design advantages. Sealed CAGEROL needle bearings are ideal where auxiliary sealing is cumbersome and expensive and are especially serviceable where relubrication is impractical.

The combination of sealing and positive roller control produces a new standard of service life. Other CAGEROL design features include crowned rollers to prevent "end-loading" and black ferrous oxide retainer finish to absorb and retain lubricant.

CAGEROL bearings offer definite performance superiority where shaft misalignment and speeds exceed the limitations of ordinary end-guided needle bearings. Often up to 10 times more life can be expected. Interchangeable with ordinary needle bearings. Also available in unsealed series.

Specify CAGEROL bearings to improve your machine performance.

Tapered retainer pockets assure proper roller guidance. Designed so retainer OD falls outside roller pitch circle to establish roller and crossbar contact on a concentric plane below center. This insures balanced roller support and eliminates corner wear from edge loading inherent in other designs.

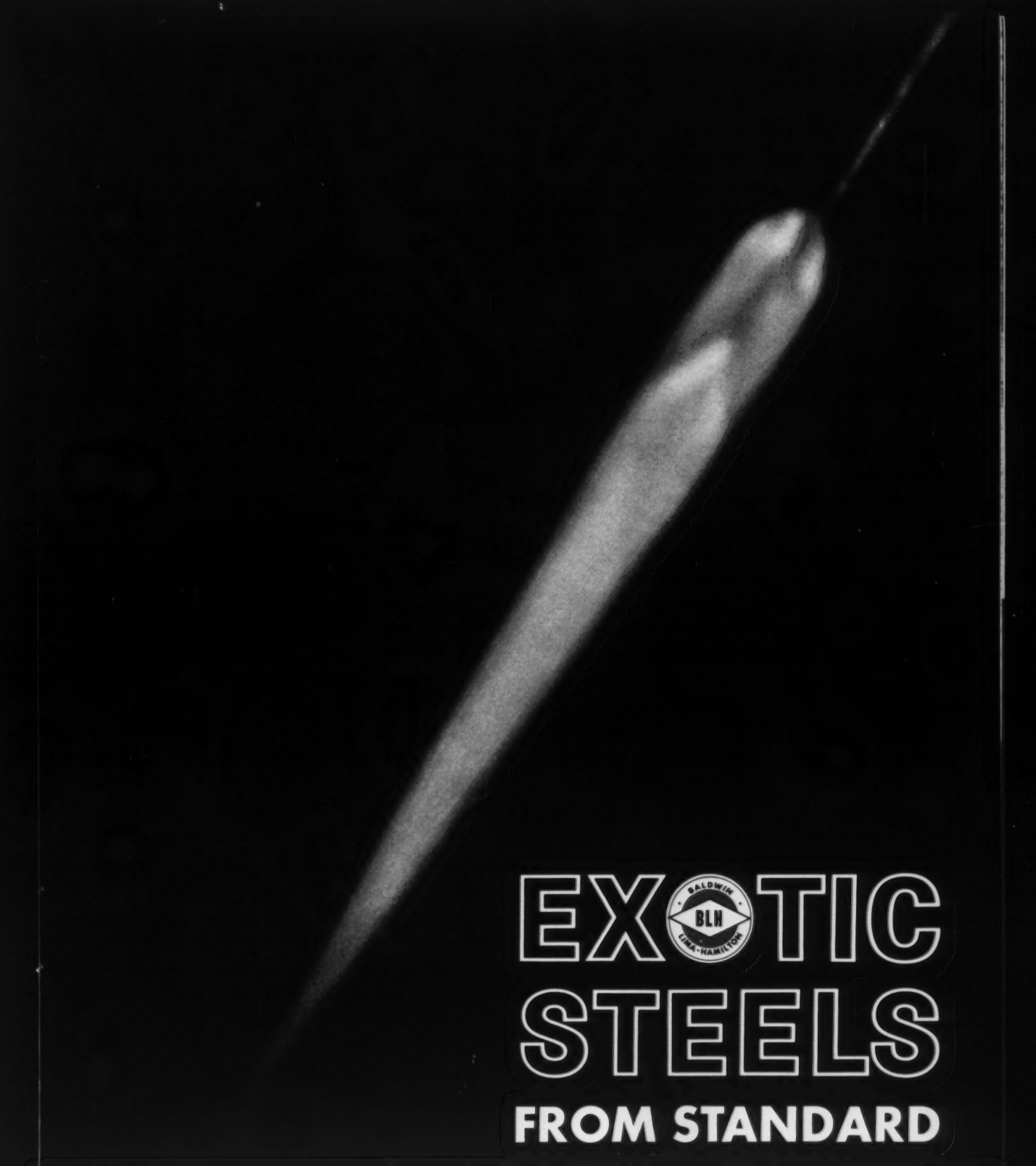
For data on the complete line of McGILL heavy duty needle roller bearings, send for bearing catalog No. 62.

McGILL MANUFACTURING CO., INC.
Bearing Division
301 N. Lafayette St., Valparaiso, Ind.

engineered electrical products

McGILL®

precision needle roller bearings



EXOTIC STEELS FROM STANDARD

Official USAF photo

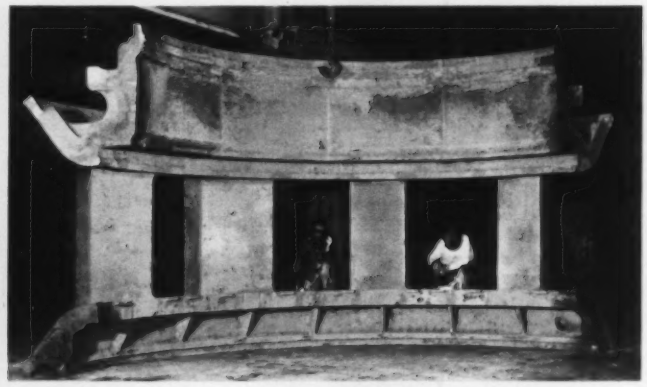
Space-Age forgings and rings to meet the most severe conditions of temperature environment and stress? Talk to Standard. We have been known in the trade for more than a century and a half as tops in quality and service. Tie *your* requirements to the experts on "can't be done" requirements.

Electric furnace, vacuum degassed steel, vacuum remelted alloys, aluminum and titanium forgings for rockets and missiles—produced under the most modern technical controls—as the trade has learned to know, that's the "specialty of the house" at Standard.

QUALITY CONTROL IS SECOND TO NONE AT STANDARD. Quality control at Standard is maintained by the most accurate, up-to-date testing equipment available. Laboratory facilities operate day and night to support our metallurgists, shop foremen, mill and machine operators—as well as plant management and, of course, our customers.

STANDARD'S OPEN-DIE FORGINGS SUPPLY NATION'S LEADING INDUSTRIES. Steel and nonferrous alloys can be worked in Standard's forge shop, including some hard-to-work metals such as titanium and super alloys. It can turn out forgings from 15 to 52,000 lb.; up to 45 inches in diameter; and up to 60 ft. in length. Major products include rotors and wheels for turbines, propeller shafts for ships, rolls for sugar, printing and rubber industries.

Standard's hundreds of customers represent every major industry in the world. Metal components of carbon and alloy steels, super alloys, and nonferrous alloys such as aluminum and titanium are supplied by Standard for an endless line of products. What particularly impresses our customers however, is the unique, personalized service we provide. See for yourself—bring your next problem to Standard.



STEEL CASTINGS TO VIRTUALLY ANY SPECIFICATIONS. The Standard foundry, one of the larger ones in the country, has turned out castings as light as 1 lb., and ranging up to 85,000 lb. They include some of the largest heads ever cast for dredge cutters and also vital components in huge hydroelectric projects throughout the world. Standard yields to none in the skill of its foundry engineers, metallurgists, molders, coremakers and core setters.

PIONEERS IN ROLL-FORGED RINGS . . . STANDARD. Standard's craftsmanship in forming metal rings for heavy industry dates back to 1856. The first all-forged weldless rings were produced in volume for the first time in 1870—at Standard. And much of the development work in forging weldless rings of high-alloy steels, aluminum and titanium has been done in Standard's Ring Department.

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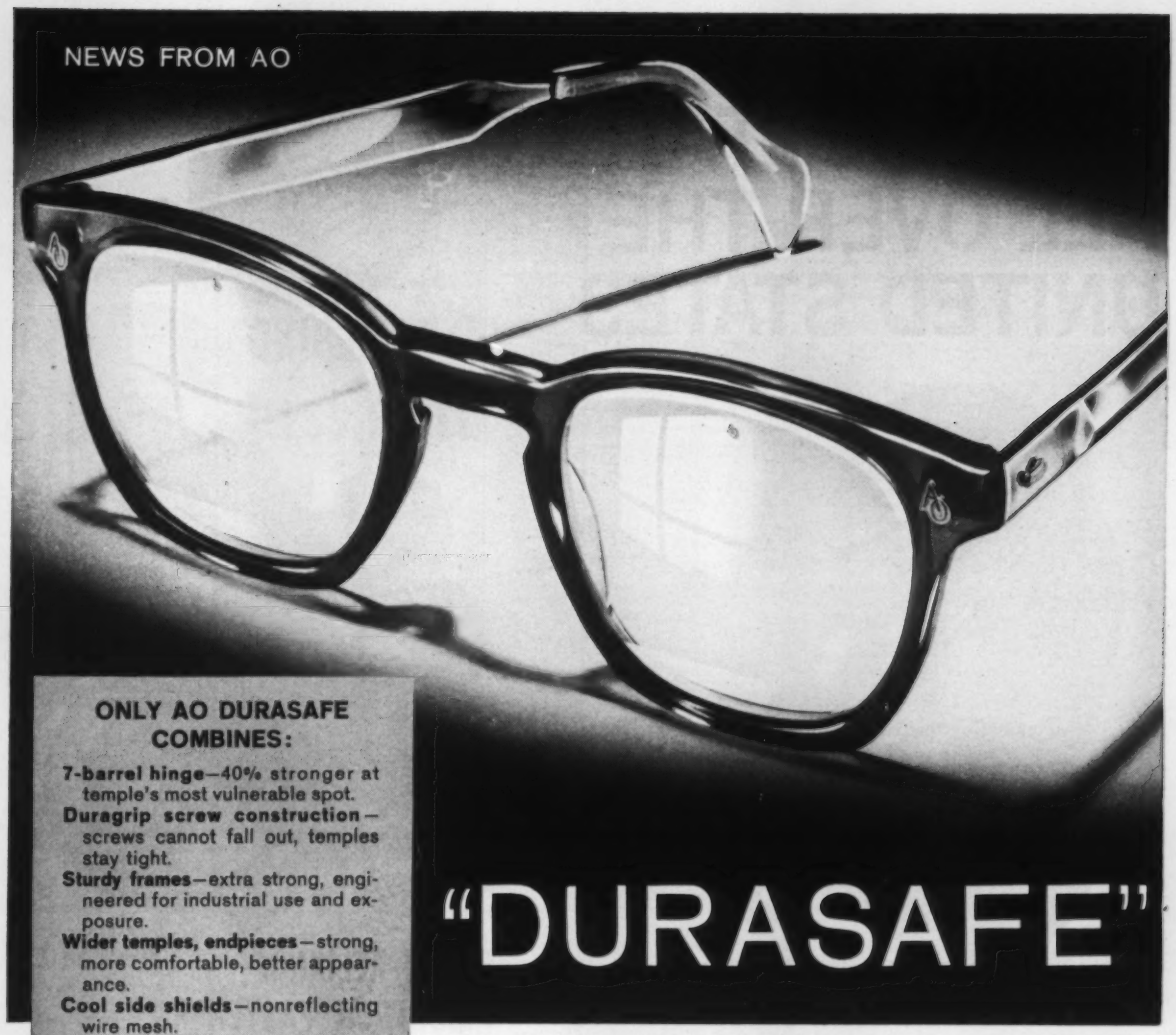

"DURASAFE"

...the glasses workers wear willingly

Your plant eye protection program's *full* effectiveness is governed by the workers' willingness to wear safety glasses (or goggles) regularly. In the new Durasafe, you have fitting qualities and a choice of colors and combinations that satisfy everyone . . . combined with the latest safety features that mean maximum protection and durability.

This wearer acceptance can be a big factor in preventing costly eye injuries. For the new Durasafe will protect against 80% of the eye hazards in an average industrial plant with a full eye protection program.* For full information on the glasses workers *want and will wear*, call your AO Safety Products Representative, or write for Bulletin S-1013.

*Other types of AO safety goggles are needed to cover special hazards.

ONLY AO DURASAFE COMBINES:

7-barrel hinge—40% stronger at temple's most vulnerable spot.
Duragrip screw construction—screws cannot fall out, temples stay tight.
Sturdy frames—extra strong, engineered for industrial use and exposure.
Wider temples, endpieces—strong, more comfortable, better appearance.
Cool side shields—nonreflecting wire mesh.
Easy to identify—AO monogram on frames and lenses identifies Durasafe at a glance.

TAKE YOUR CHOICE OF

Solid colors
Smoke (F9800SM)
Mahogany (F9800M)
Pink Crystal (F9800PC)
Two-tones
Smoke on Crystal (F9800SC)
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Black on Crystal (F9800BC)
Temples
Plastic comfort cable
Metal core plastic spatula
Aluminum with plastic tip
Full range, bridge & eye sizes
Safety Rx or plano lenses
With or without side shields

Your Surest Protection . . . AO SURE-GUARD Glasses

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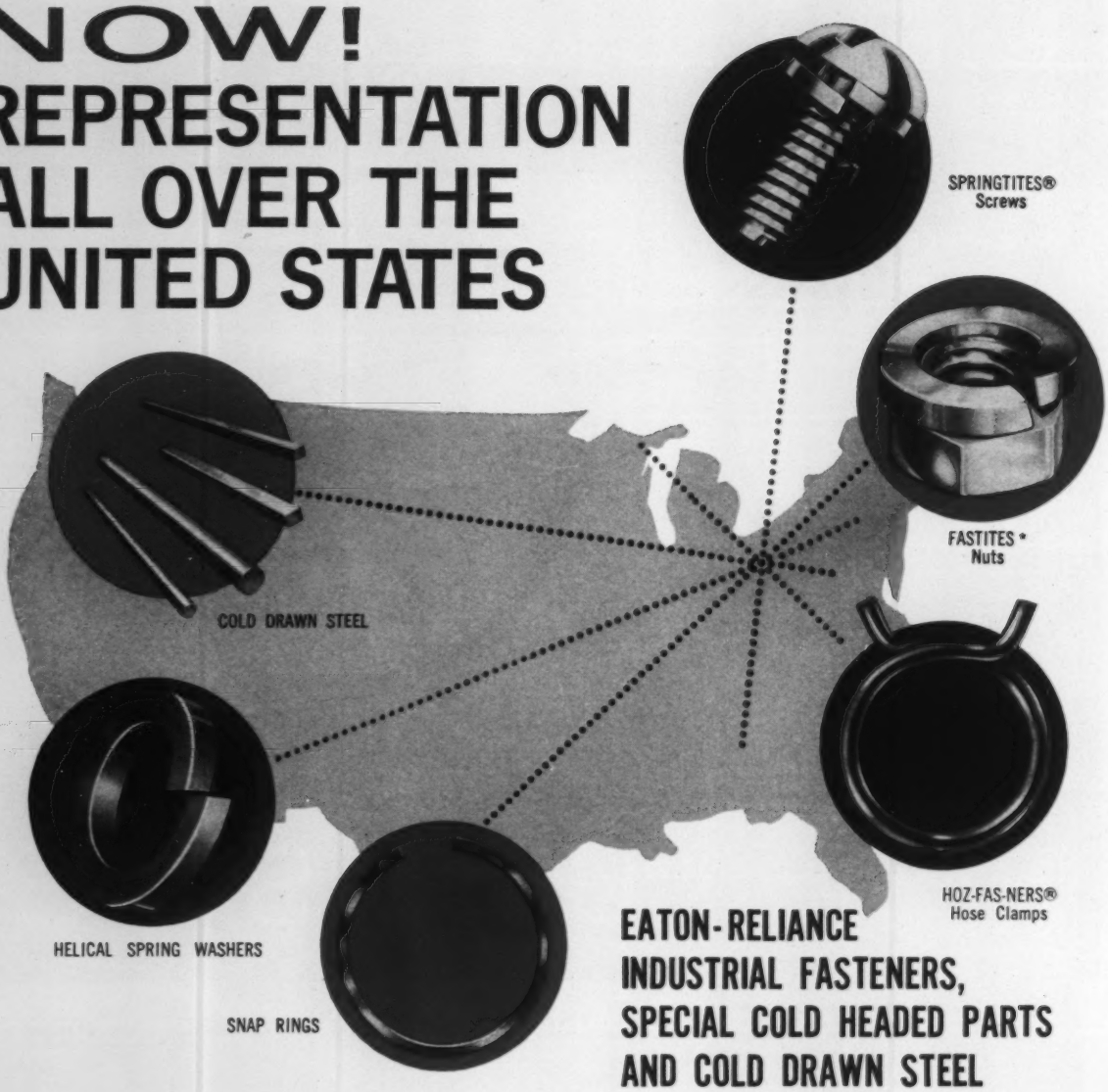

EATON-RELIANCE INDUSTRIAL FASTENERS, SPECIAL COLD HEADED PARTS AND COLD DRAWN STEEL

If you use industrial fasteners or cold drawn steel, you will get faster, better service by contacting Eaton-Reliance. A recent shift in sales offices brings personal sales and engineering services to the doorsteps of all major industrial centers of the country.

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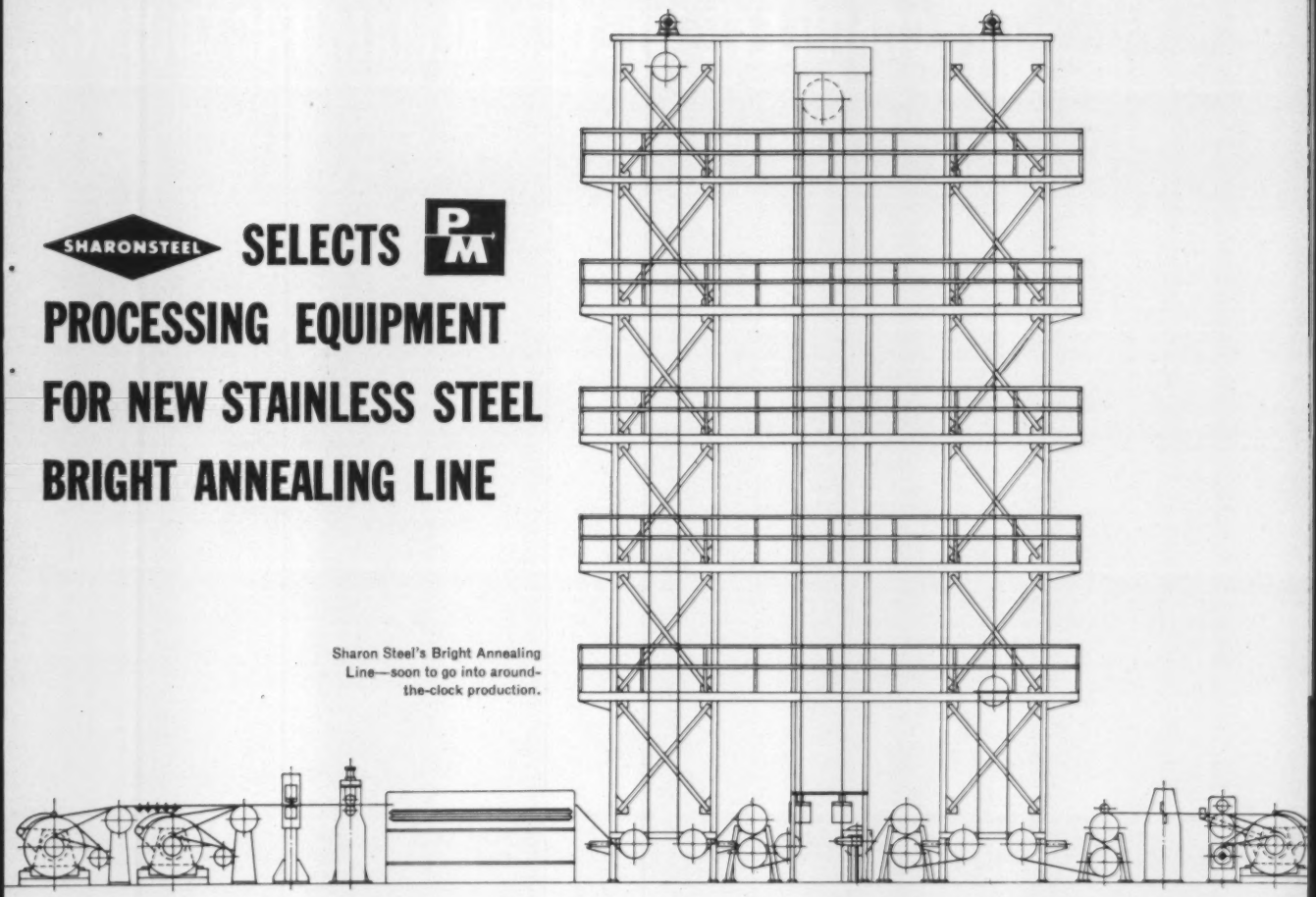
SALES AND ENGINEERING SERVICE OFFICES STRATEGICALLY LOCATED THROUGHOUT THE UNITED STATES

SHARONSTEEL **SELECTS** P/M

PROCESSING EQUIPMENT FOR NEW STAINLESS STEEL BRIGHT ANNEALING LINE



Sharon Steel's Bright Annealing Line—soon to go into around-the-clock production.

Today's most interesting development in the automotive trim market is the volume production of bright annealed stainless strip. Sharon's decision to adopt this process backs up their aim of providing a bright decorative strip that meets the most severe corrosion tests.

When Sharon Steel Corporation—one of the pioneers in stainless steel production—engineered their new, modern bright annealing line, they specified equipment designed and built by Production Machinery Corporation that will enable the line to give:

- stainless strip with a quality surface finish—protected by non-marking rolls
- continuous operation with minimum maintenance
- positive, sure strip tracking provided by 7 edge control points
- fastest coil handling and joining because of efficient, engineered equipment arrangement

Remember, P/M will design and produce what you require—the way you want it—when you need it. Let our engineers show you what "productioneered" processing lines and equipment can do to cut operating costs in your plant—build increased profits.

Production Machinery Corporation
Mentor, Ohio

Designers and Builders of Metal Processing Lines and Equipment including: lines for pickling, annealing, slitting, shearing, and cutting-to-length, grinding, scouring, coil build-up, inspection, and other sheet and strip processing lines and machinery.

P/M

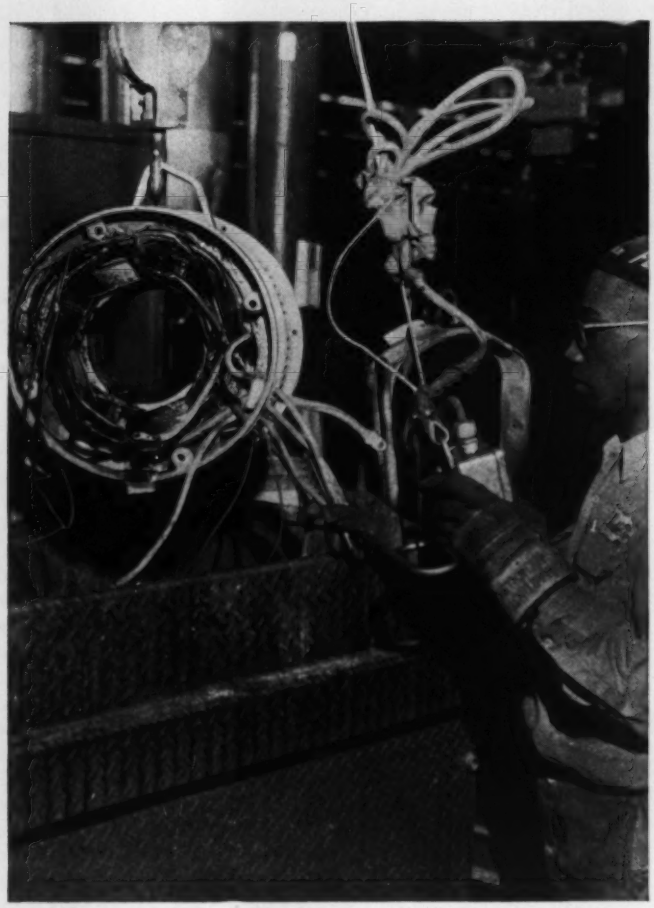
Lincoln Electric's plan for . . .

COMPLETE WELDER REMANUFACTURING . .

Machines returned to the plant for remanufacturing are completely torn down and rebuilt with new parts where needed. All work is done at published prices known beforehand. Owner receives new machine guarantee on completion of the work.

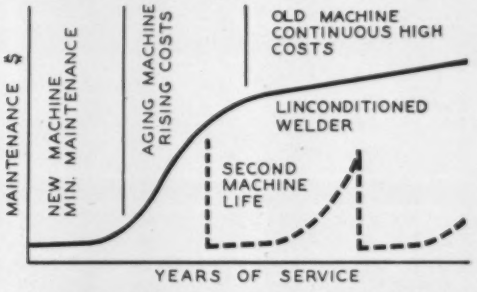
. . . REDUCES CAPITAL INVESTMENT, PRESERVES PROFITS

If you own Lincoln welding equipment, you know it traditionally outlasts other makes. Routine maintenance is all that's needed to keep it in top operating condition. But any machine reaches a point where mounting repair costs indicate the need for a complete overhaul. Lincoln provides a complete factory remanufacturing service for owners of Lincoln equipment. It's called Linconditioning. Because Linconditioned welders carry a new machine guarantee, effective life of your welder is extended 100% at about half the cost of a new machine. This kind of service, we believe, helps Lincoln customers battle indirect costs, preserve hard-to-keep profits.



Your welder is disassembled right in the Lincoln plant by trained factory mechanics; then completely overhauled and remanufactured. Parts are restored to like-new condition. Those beyond repair are replaced with the same new parts which go into brand-new machines. Here, frames from generator-type machines are vapor-degreased. Dirt and dust is removed from the coils which are then tested for grounds, shorts and electrical balance. Each must test out like new before assembly.

Gas and diesel engines for portable welders are thoroughly reconditioned, too. Blocks are cleaned, inspected for cracks, sizes and general condition. Cylinders are re-bored, honed to proper oversize and finish. Valves and crankshafts, checked for wear, are reground and buffed. New piston rings are precision-fitted to bore size. After re-assembly, engine is idle-run to wear in.



Here's a graphic expression of Linconditioning. When a machine is new, it requires little if any maintenance. As it ages, the occasional service it needs can be obtained from your local Lincoln field service shop. But eventually, the frequency of repairs causes constant expense. At this point, Linconditioning restores your machine to new condition, doubles its effective service life . . . all at a price varying from 40-50% of the cost of a new machine. Find out more about this money-saving remanufacturing plan now. Contact your local Lincoln field engineer. Or, write for bulletin 9100.1.

THE LINCOLN ELECTRIC COMPANY • DEPT. 2971 • CLEVELAND 17, OHIO

LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES

Now **you can get USS "T-1" Steels from Steel Service Centers coast to coast.**

USS "T-1" Steel outlasts other steels 3 to 1 handling oyster shells, sand and gravel

Bucket frequently bangs against bottom of barge. USS "T-1" Steel's greater toughness and resistance to impact abrasion and corrosion more than tripled bucket life.

"It takes a mighty tough steel to scoop cubic yard after cubic yard of oyster shell, sand and gravel day in and day out—and still not break down under rough handling and wear. In this service, USS "T-1" Steel outlasts other steels used three to one."

These are the words of a big Texan, L. M. (Buck) Clark, vice-president and assistant general manager of Southern Materials Corporation, Freeport, Texas. The firm provides wholesale quantities of oyster shell, sand and gravel dredged up from the Gulf bottom for fill, road construction and concrete work.

In the past, their 1½-yard clamshell bucket lasted for about six months handling sand and gravel and about twice as long scooping shell. One repair job cost $1,280 and results were no better. Then it was decided to substitute USS "T-1" Constructional Alloy Steel for the lips, end panels and side panels of the buckets. The repair job was done in the company shop and the cost was about $500. Mr. Clark says, "During the two years since I put 'T-1' Steel in, it's been holding up fine."

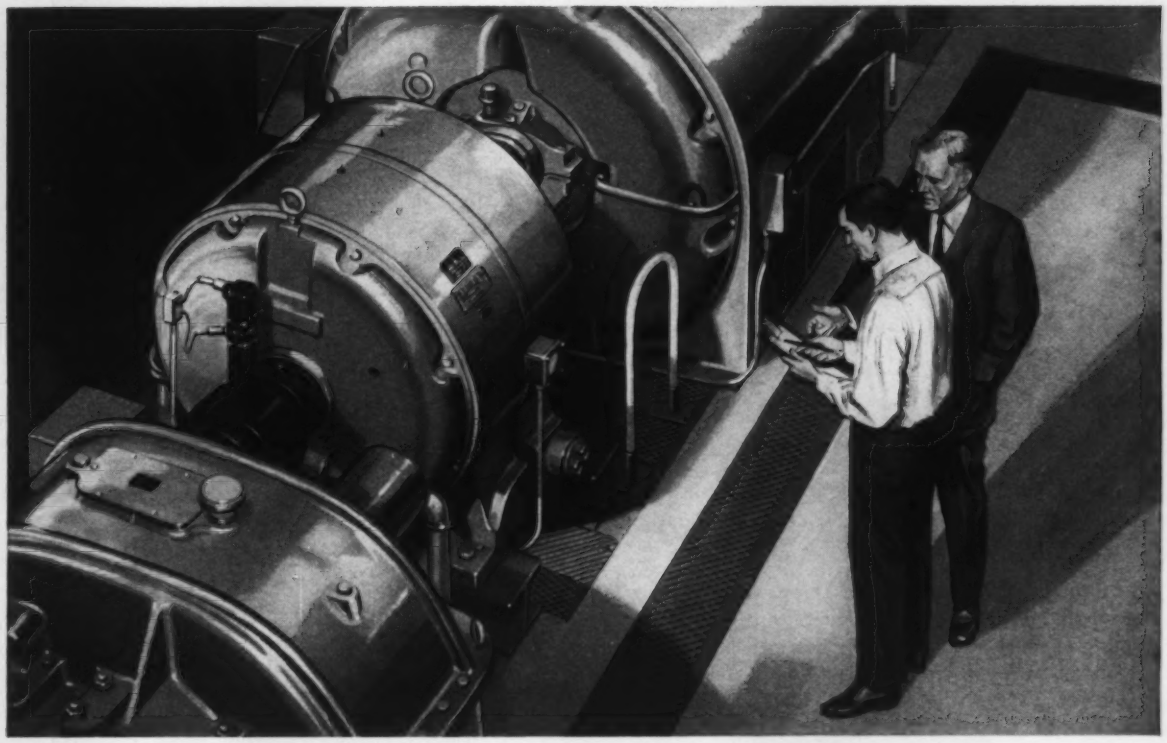
The USS "T-1" Steel used was furnished to 321 minimum Brinell hardness and does a much better stand-up-take-it than anything else that was tried.

Besides resistance to impact and abrasive wear, USS "T-1" Steel solved a severe case of corrosion from salt air in both the bucket and the hopper. Corrosion build-up had to be chipped away in the old equipment causing a lot of downtime. USS 'T-1' Steel reduced maintenance about 50%.

USS "T-1" Steel and the new, lower-priced USS "T-1" type A Steel can be furnished to a minimum yield strength of 100,000 psi, or a minimum hardness of 321 Brinell, depending on application. USS "T-1" Steel can also be furnished to 360 Brinell. Both of these tough, weldable steels can reduce weight and increase the strength and life of your equipment. Call your local Steel Service Center for more information. Or, for the name of the distributors of USS "T-1" Steels nearest you, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal and Iron Division
United States Steel Export Company

USS United States Steel



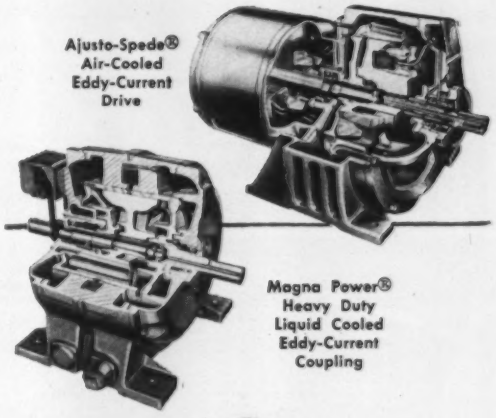
Place Your Speed Control Problems in the Hands of Experts!

As the originator and leading producer of eddy-current speed control equipment, it is only natural that Eaton-Dynamatic offers many exclusive design and construction advancements —plus expert engineering service.

The transmission of torque across an air gap by means of eddy-currents is a fundamental Dynamatic development. It was first utilized 30 years ago, and is today the operating principle of a full line of couplings, brakes, drives, and dynamometers serving industry wherever accurate control of speed and torque is required.

Eddy-current equipment runs on standard AC—requires no special power source. Electronic or transistorized magnetic amplifier controls, engineered and manufactured by Eaton, provide constant speed, infinitely adjustable speeds, and many specialized operating functions.

Representatives, located in all principal cities, are fully qualified to give you expert help with your speed control or torque transmission problems. Call the Eaton-Dynamatic representative nearest you today—there's no obligation.



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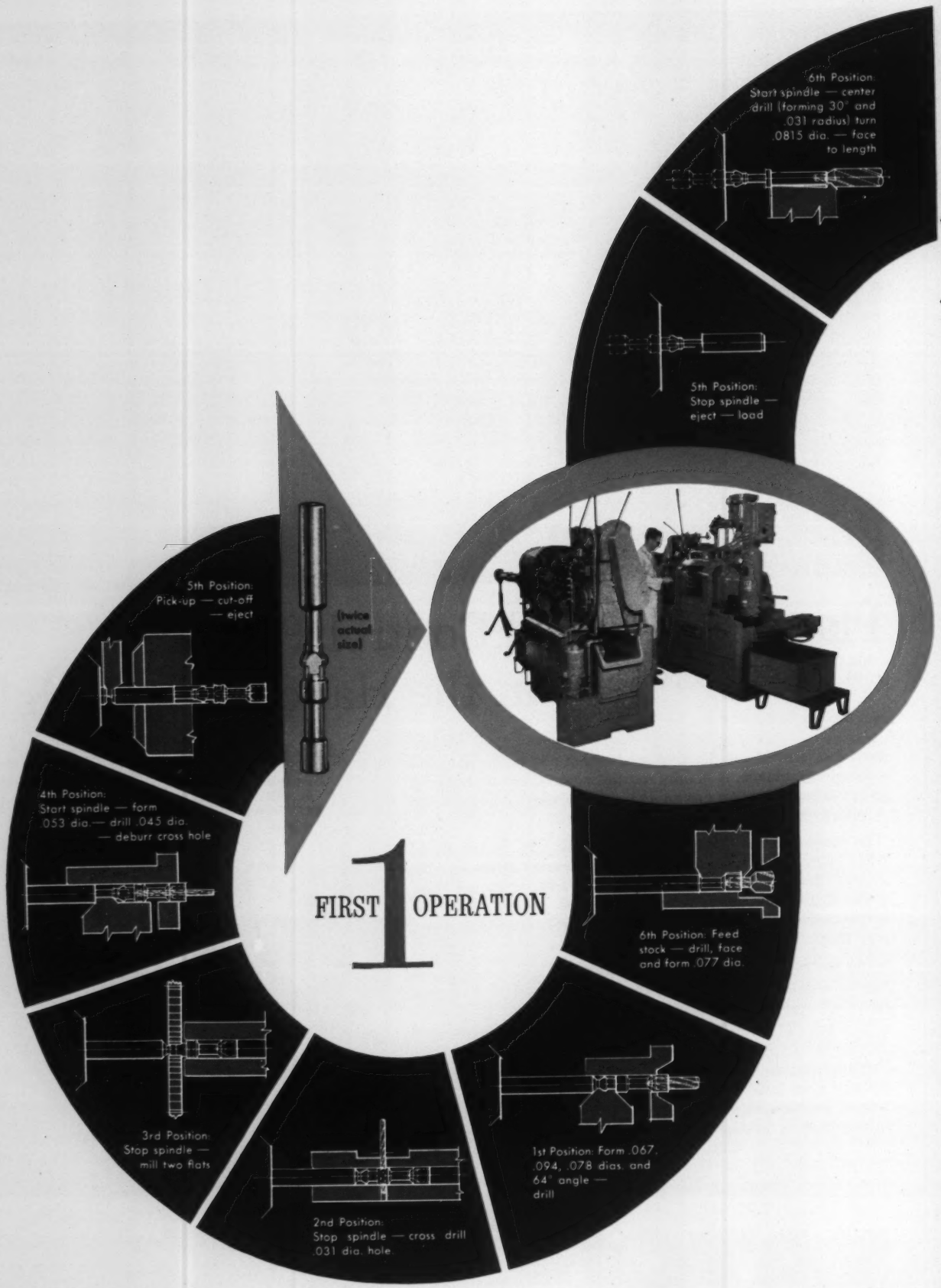
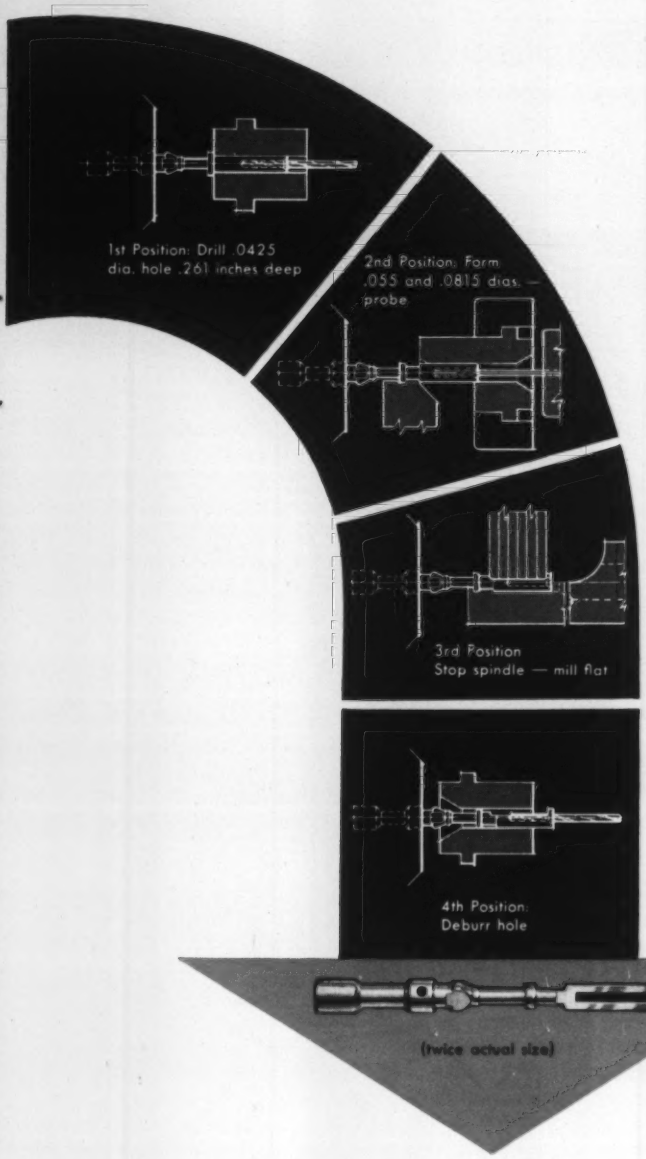

6th Position:
Start spindle — center drill (forming 30° and .031 radius) turn .0815 dia. — face to length
5th Position:
Stop spindle — eject — load
(twice actual size)
5th Position:
Pick-up — cut-off — eject
4th Position:
Start spindle — form .053 dia. — drill .045 dia. — deburr cross hole
FIRST 1 OPERATION
6th Position: Feed stock — drill, face and form .077 dia.
1st Position: Form .067, .094, .078 dias. and 64° angle — drill
2nd Position:
Stop spindle — cross drill .031 dia. hole
3rd Position:
Stop spindle — mill two flats


1st Position: Drill .0425 dia. hole .261 inches deep
2nd Position: Form .055 and .0815 dias. — probe
3rd Position Stop spindle — mill flat
4th Position: Deburr hole
(twice actual size)

ACME-GRIDLEYS REDUCE MACHINE TIME 80% OPERATOR TIME 70%

...FOR SCINTILLA DIVISION OF THE BENDIX CORPORATION

When it comes to economically turning out large quantities of identical precision parts, most cost-conscious manufacturers rely on Acme-Gridleys. A good example is one of the nation's leading suppliers of electrical connectors to space age industries, Scintilla Division of The Bendix Corporation, Sidney, New York.

Recently, Scintilla converted production of an electrical contact socket and connector to 7/16" RA-6 Spindle Acme-Gridleys. Working to tolerances of .002 on turned diameters, .005 on concentricities and 50 microinches or better on drilled holes, the Acme-Gridleys reduced per-piece machine time 80% and operator time 70%! There was also a significant reduction in the reject rate.

Savings like this are the big reason Scintilla has close to *seventy* Acme-Gridleys in their modern production setup. In your plant, Acme-Gridleys will pay off in similar cost reductions . . . for years to come.

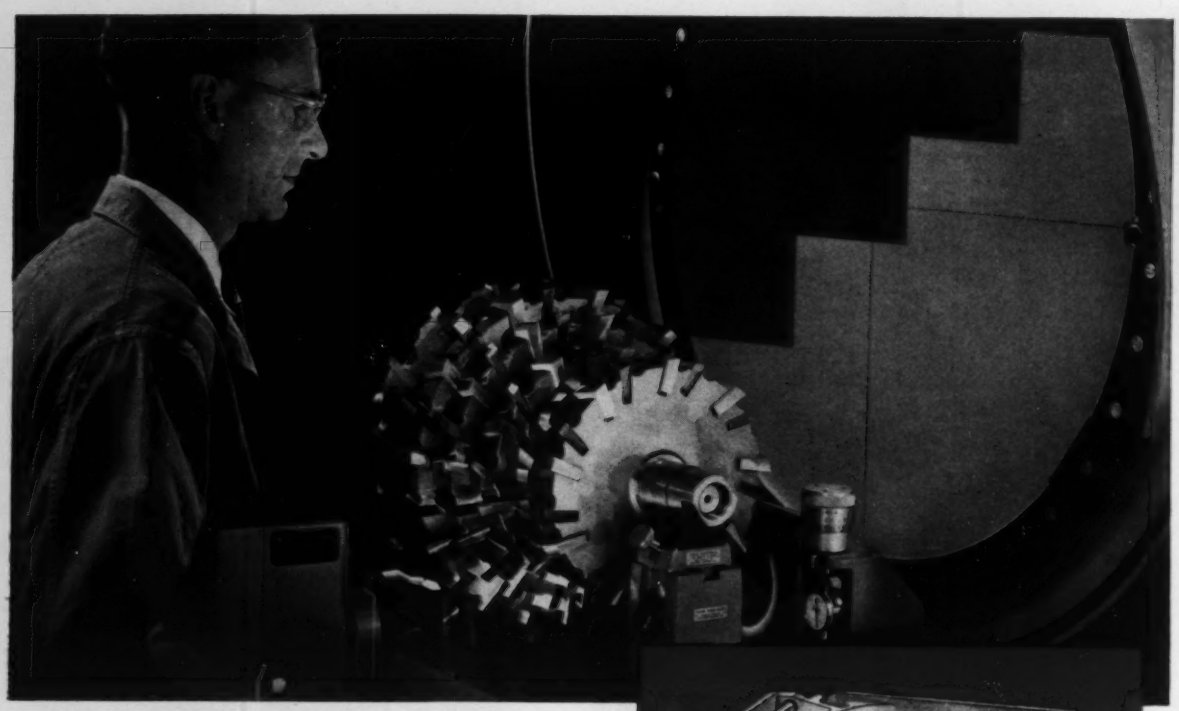
SECOND 2 OPERATION

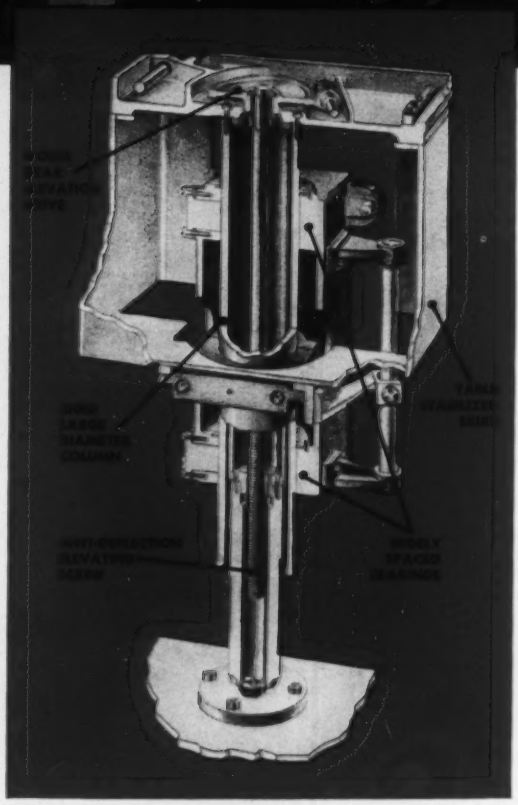
The number of different jobs that can be set up on Acme-Gridleys amazes everyone. To give you some idea, we've described some 57 actual jobs in a new 64-page bulletin called "Circumferential Automation at Work". At your request, we'll be happy to send you a copy. Call, write or wire.

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.





Built by EX-CELL-O

To Insure Accuracy

Rugged, precision construction of Ex-Cell-O Contour Projectors results in stable support for the optical systems providing accuracy in the order of .0001″. This rigidity is a major consideration in achieving for Ex-Cell-O Projectors an outstanding record of trouble free operation and almost total elimination of down time.

Typical of the sturdy, precision workmanship to be found throughout Ex-Cell-O Contour Projectors is the worktable of the Model 14-5 and Model 30. Engineers will recognize the superior design features shown in the inset at right. To cite just a few, the large 5″ O.D. columns, supported in widely spaced bearings; the heavy channel skirt to stabilize the table assembly and the flexible elevating screw which can't impart deflections to the column.

Because of these construction features Ex-Cell-O Contour Projectors support heavy loads firmly, yet move easily and smoothly.

Whether your problem involves receiving, production or final inspection there's an Ex-Cell-O Contour Projector to do the job accurately, quickly and at low cost. The "why" and "how" is condensed in our new booklet—"43 Reasons Why Ex-Cell-O Contour Projectors are the First Choice of Industry." Yours for the asking!

Manufactured by EX-CELL-O Corporation at Detroit, Mich.

SOLD AND SERVICED BY

CP61-2

OPTICAL GAGING PRODUCTS, INC.

26 FORBES STREET ROCHESTER 11, N. Y.

Subsidiary of EX-CELL-O Corporation

CUT WIRE COSTS UP TO 60%!

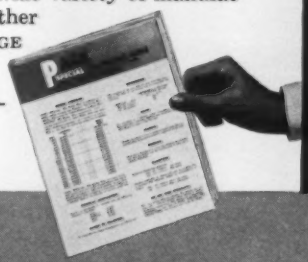
...with Page Special HB

If you are now using music wire, or if you have been prevented from using it because of its high cost, it makes good sense to investigate PAGE *Special* HB. In every case, the tensile strengths of *Special* HB approach those of music wire—and in sizes .090″ and coarser equals them! Moreover, *Special* HB costs as much as 60% less than music wire.

A hard-drawn, high-carbon steel wire, *Special* HB is available in galvanized or bright finishes and in diameters from .020″ to .162″. We'll be glad to send you the full story, including a detailed comparison of tensile strengths.

As America's leading special-purpose wire mill, PAGE can supply a wide variety of manufacturers wire items with just the tensile strength, ductility, finish and other properties you need. Tell us your requirements—we'll recommend a PAGE wire to help you reduce costs and improve your product.

Write us at Monessen, Pa. for Booklet **DH-107** on *Special* HB—or for information on what PAGE has to offer to meet your other wire requirements.



PAGE

the source for answers to wire problems

ACCO

PAGE STEEL AND WIRE DIVISION • AMERICAN CHAIN & CABLE COMPANY, INC.

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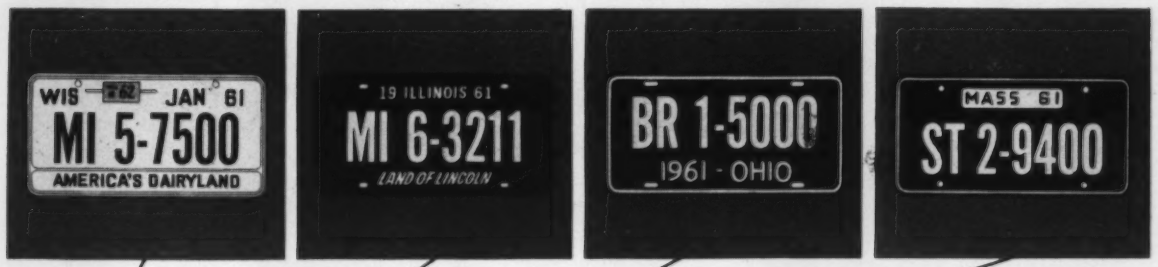

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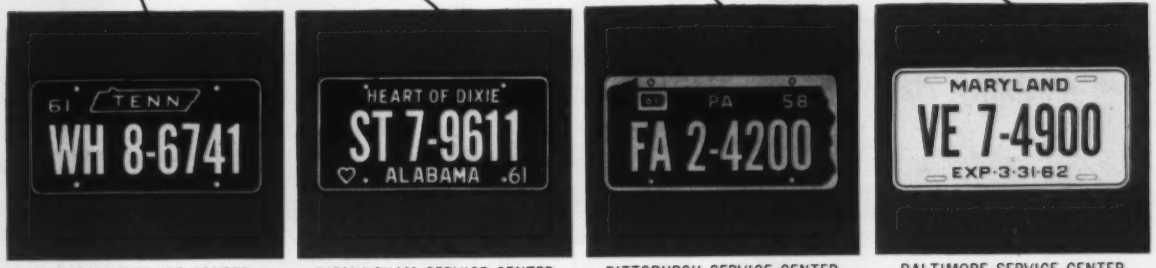

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all stamped with the T-MARK of total reliability

Other spring fasteners may *look* like Tinnerman SPEED NUTS. But only those stamped with the T-mark really *are* SPEED NUTS, made to Tinnerman's high, precise standards of reliability. Tinnerman quality controls are the most stringent in the industry. And only Tinnerman stocks a *half-billion* SPEED NUTS . . . is tooled to turn out 10,000 variations . . . develops 25 *new* designs each week. Protect your product's good name by insisting on genuine SPEED NUTS. Stamped with the Tinnerman "T"—the mark of total reliability. *Tinnerman Products, Inc., Department 12, Box 6688, Cleveland 1, Ohio.*

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario.
GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales.
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TINNERMAN
Speed Nuts®
Look for the Tinnerman "T"

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DENISON HydrOILics

How **AUTOMATIC ELECTRIC** assembles critical phone parts on **DENISON** Multipress via high precision...

SPINNING

HIGH PRECISION SPINNING *required for final assembly of delicate telephone receiver parts is done within specified tolerance of .001" on this Series "R" Denison Multipress in new Clean Room at Automatic Electric, Northlake, Ill. Write for free Bulletin 324—new "R-S-T" Series Multipress.*

FINAL ASSEMBLY of the vital operating components in Automatic Electric's new type 810 telephone receiver calls for an ultra-clean assembly area . . . *plus precision presswork to tolerances of .001".*

This Denison hydraulic Multipress is one of three Series "R" 8-ton Multipresses installed by Automatic Electric to handle key assembly operations in their new Clean Room.

Equipped with a special spinning die, this Multipress spins the telephone receiver shell-terminal board assembly to a frame-retaining ring assembly . . . joins these fragile parts in an airtight seal against dirt and moisture. Smooth, precisely controlled hydraulic ram pressure—an inherent performance feature of *every* Multipress—permits a positive, hermetically sealed closure with no damage to the delicate receiver components.

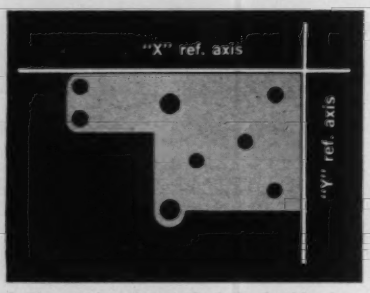
Do you have a pressing problem? Ask your nearby Denison Production Specialist about a **M**ultipress **A**nalysis **P**rogram in your plant. He'll help you **MAP** new ways to cut time and costs... improve quality on your toughest production jobs.

DENISON ENGINEERING DIVISION
American Brake Shoe Co.
1180 Dublin Road • Columbus 16, Ohio

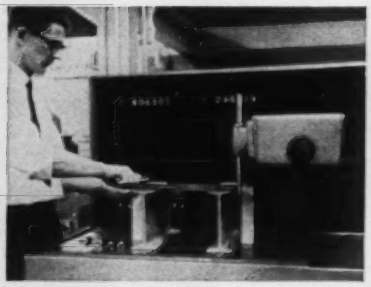
HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

DENISON
HYDRAULIC MULTIPRESS

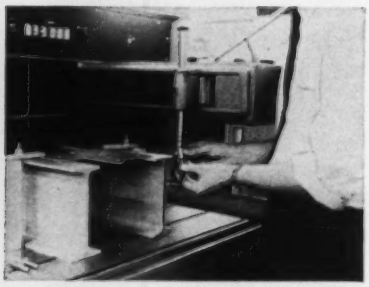
Sheffield Ferranti FI-22 locates holes to within .001″ faster than you can read this



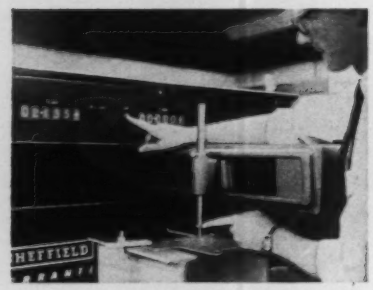
1. The problem: locate the holes in this piece to within .001″. Here's how it works.



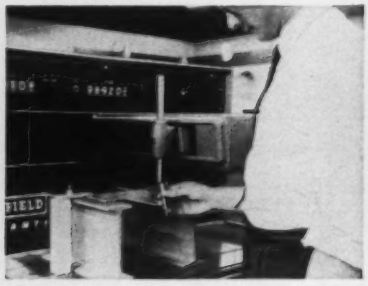
2. Mount and clamp workpiece to table. Working range of table is 15″ by 24″.



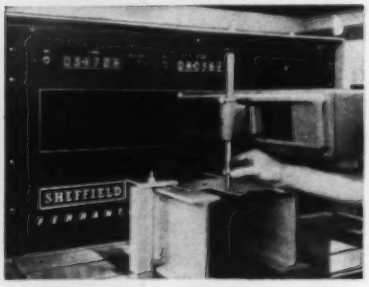
3. Insert flat probe for aligning and locating reference edges of work piece.



4. Move spindle along "X" axis until probe touches reference edge, and push zeroing button. Repeat for "Y" axis.



5. Replace flat probe with suitable tapered probe. Interchangeable tips available for a wide range of hole sizes.



6. Move spindle over piece, and lower probe into hole. Numerals in readout panels will indicate exact hole position to .001″.

You can see why the FI-22 is up to ten times faster than conventional surface plate and height gage inspection. On top of that, you can use it for layout scribing and center-punching. Write for Bulletin FI-22X and ask your Sheffield representative where you can see a demonstration of this machine.

The SHEFFIELD Corporation Dayton 1, Ohio

A subsidiary of The Bendix Corporation

Inspection Gages, Dimensional Control Instruments, Machine Controls, Automatic Gaging & Assembly Systems, Measuray® X-Ray Thickness Measuring, Crushtrue® & Multiform® Grinders, Cavitron® Ultrasonic Machine Tools, Press-Pacer® Transfer Units, Large Dies, Tooling, Contract Manufacturing.

Quality in Ascendancy

The superiority of the vast number of products that are — and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

You pay for mechanical and dimensional uniformity when you buy flat spring steel . . . you get it when you buy Roebling.

For information on how our products can help yours, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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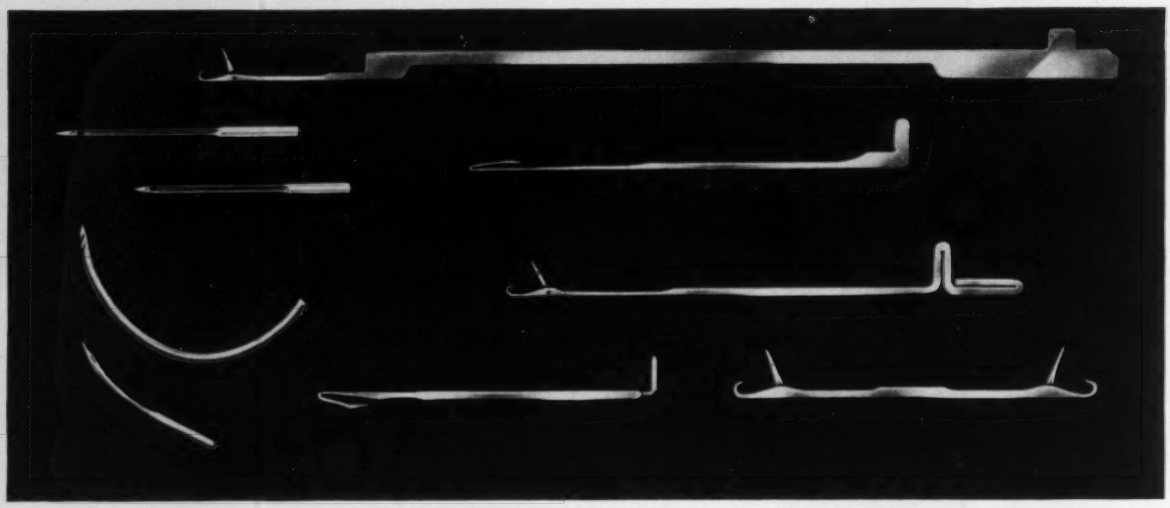
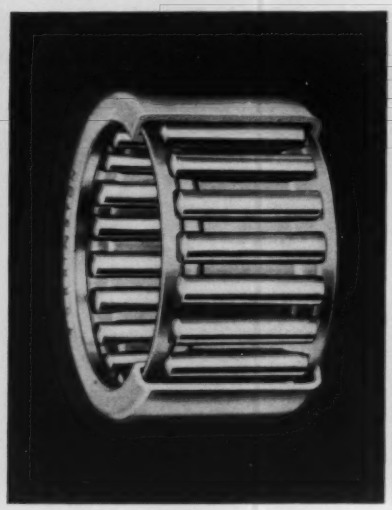
Roebling... Your Product is Better for it

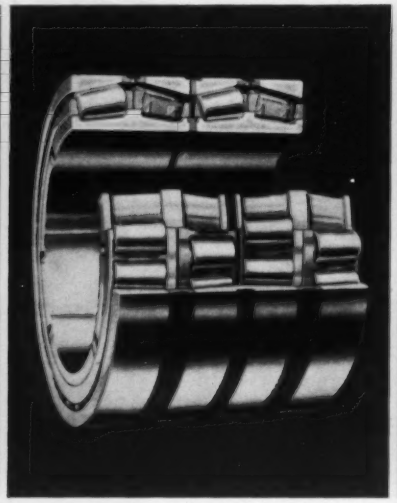
YES, TORRINGTON IS AMERICA'S LARGEST PRODUCER OF KNITTING AND SEWING MACHINE NEEDLES...



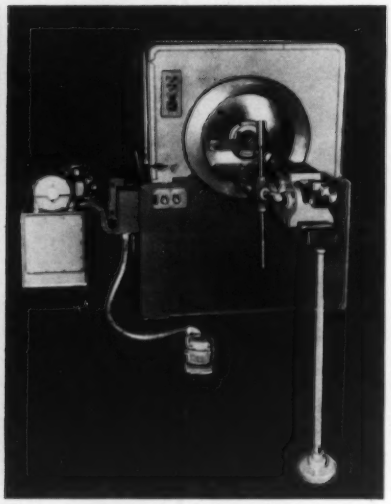
BUT THIS, TOO, IS TORRINGTON...



Pioneer manufacturer of the new Drawn Cup Roller Bearing for simplified design and increased efficiency of appliance motors, generators, and many other products.



A leading producer of 4-row tapered roller bearings specifically designed and engineered for heavy duty applications in steel, aluminum and other metal rolling mill equipment.



World's largest manufacturer of rotary swaging machines for economical chipless machining, newest of which is the versatile Electro-Hydraulic Die Closing Swager shown here.

In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

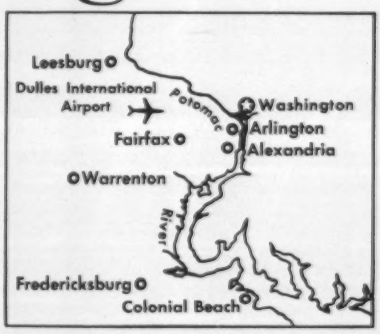
Serving industry from plants located in the United States, Canada, England, Germany and Italy

Single-Place Gyrocopter by Bensen Aircraft Corp.

Looking for production savings?

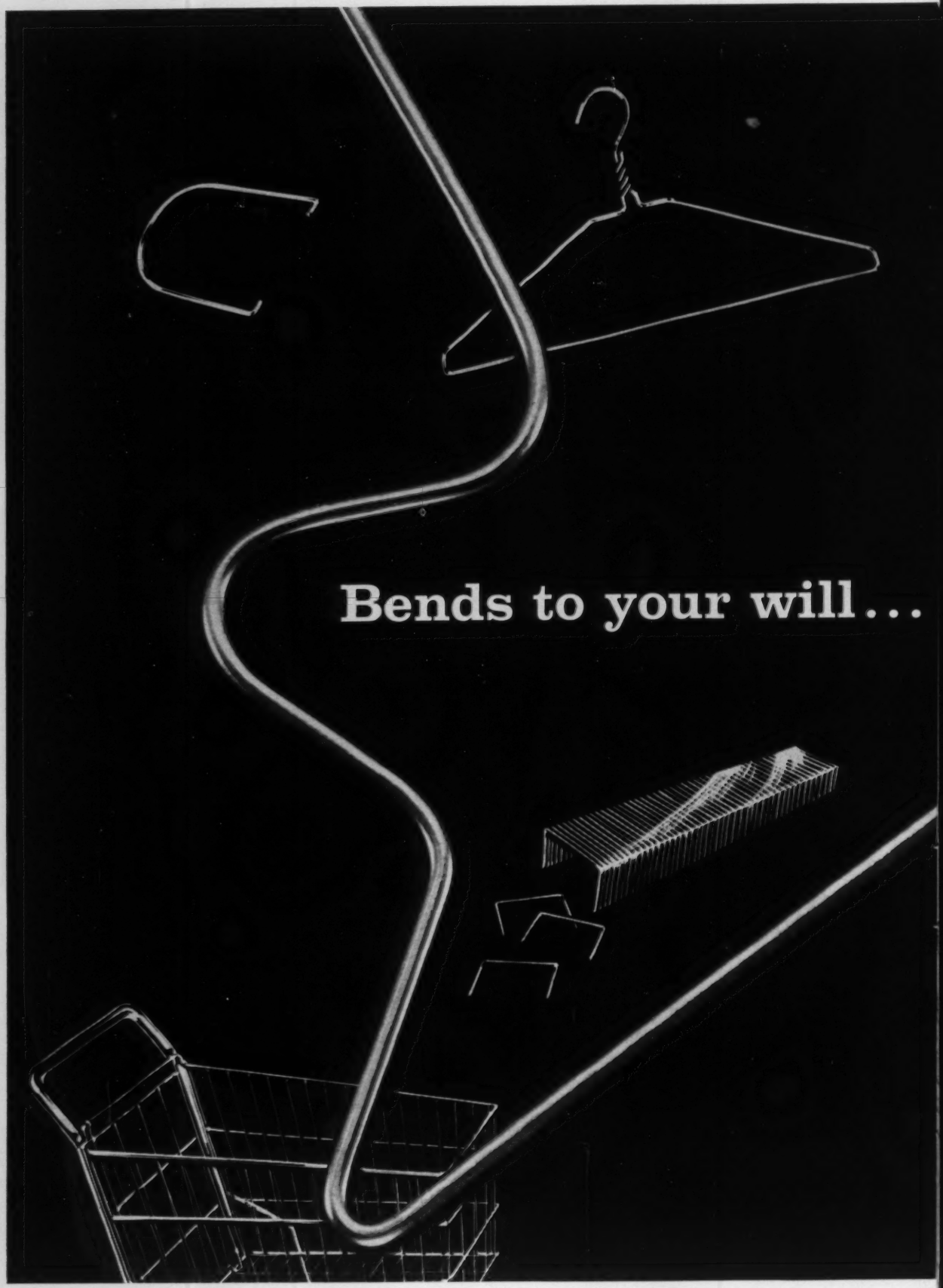
Look into Northern Virginia

Planning a research center or light technical plant? You'll find important savings of productive time in being close to the matchless research facilities of the Nation's Capital. And the area's air facilities, including new Dulles International Airport, put you close to research and scientific operations throughout the world. Write, wire or phone VEPCO for available site and economic data on this area's hospitable communities, where trained personnel find congenial living and a rich cultural life.



VEPCO VIRGINIA ELECTRIC and POWER COMPANY

Clark P. Spellman, Manager—Area Development, Electric Building, Richmond 9, Virginia • MIlton 9-1411
Serving the Top-of-the-South with 2,086,000 kilowatts—due to reach 2,720,000 kilowatts by 1963.


Bends to your will...

CF&I Manufacturers Wire

If you want wire that forms easily or if you have a wire-forming problem, CF&I low carbon manufacturers wire can provide the answer. For example, this wire has the **ductility** that means more efficient fabrication on multiple slide machines . . . the **easy weldability** that speeds production and boosts end-product quality. It's available in sizes ranging from .500 inch to .0348 inch*, in both low carbon and medium carbon steel, and in a variety of finishes and tempers. Here are some typical examples of manufacturers wire produced by CF&I:

Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Cold Rolling Quality Wire
Concrete Wire Accessories
Garment Hanger Wire
Hay Baling Wire (Coiled)
Heading or Forging Quality Wire
Industrial Quality Wire
Medium High Carbon Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Roll Threading Quality Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire

CF&I engineers will be happy to consult with you concerning your wire-forming problems and recommend exactly the type, grade and finish of wire that's best for your operation.

In addition, CF&I Wire is "packaged for your production" in special packages to increase the efficiency and economy of your operation. For complete details and prompt service, contact your nearby CF&I sales office today. 8498

*Available in the West in size ranges from .625 to .0348

Steel means strength, beauty, economy.

The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales Offices in Key Cities

AAF cleans, heats, moves air

A battery of AAF dry-type dust collectors exhausting grinding operations. After-cleaners on collectors provide for re-circulation of cleaned air.

AAF packaged central station air handling units, suspended from the ceiling in the warehouse, save valuable space, provide quiet operation.

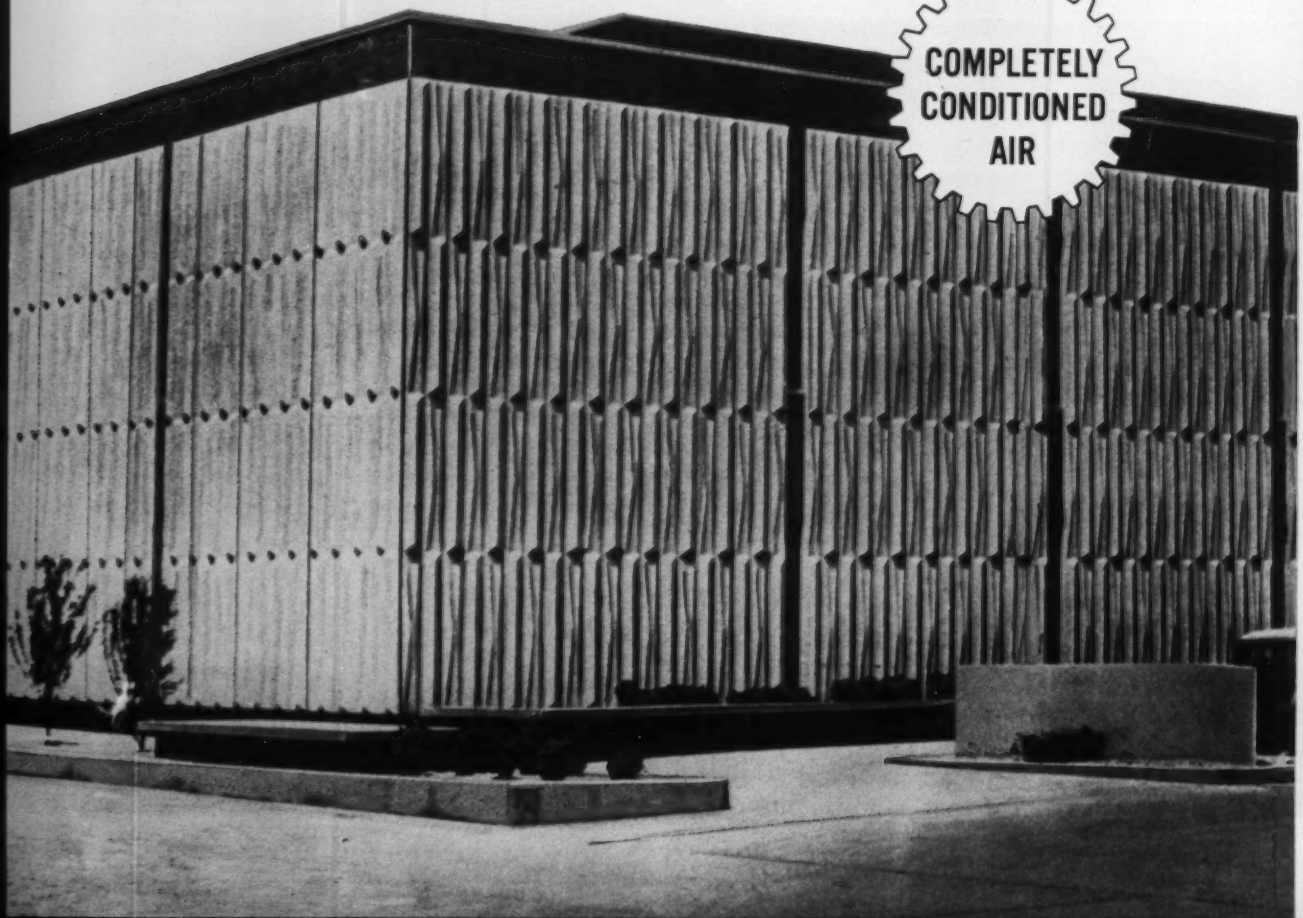
AAF

AIR CLEANING PRODUCTS
Air Filters
Dust Collectors

AIR CONDITIONING, HEATING & VENTILATING PRODUCTS

AAF electronic air cleaners provide clean air for the Maytag Headquarters Building, Newton, Iowa. Architects: Brooks-Borg, Des Moines. Air Conditioning Engineer: William Nanes, Des Moines.

COMPLETELY CONDITIONED AIR



to make it work for Maytag

Multi-product installation demonstrates AAF's capability for complete air engineering

THE manufacture of major appliances demands that air be put to work in many different ways. Here are the jobs it had to do at the Maytag office and plants in Newton, Iowa: (1) help keep the interior of the impressive new headquarters building perpetually clean, (2) control dust from grinding operations, (3) provide heating and ventilating for the warehouse and service repair area, (4) control dust from polishing operations, (5) provide proper exhaust from plant and processing operations, and (6) help provide a dust-free atmosphere in the enameling department.

AAF is the only company that provides *all* the major components for *completely* conditioned air. Just as important, AAF offers the knowledge and experience to coordinate the functioning of these components into one integrated system.

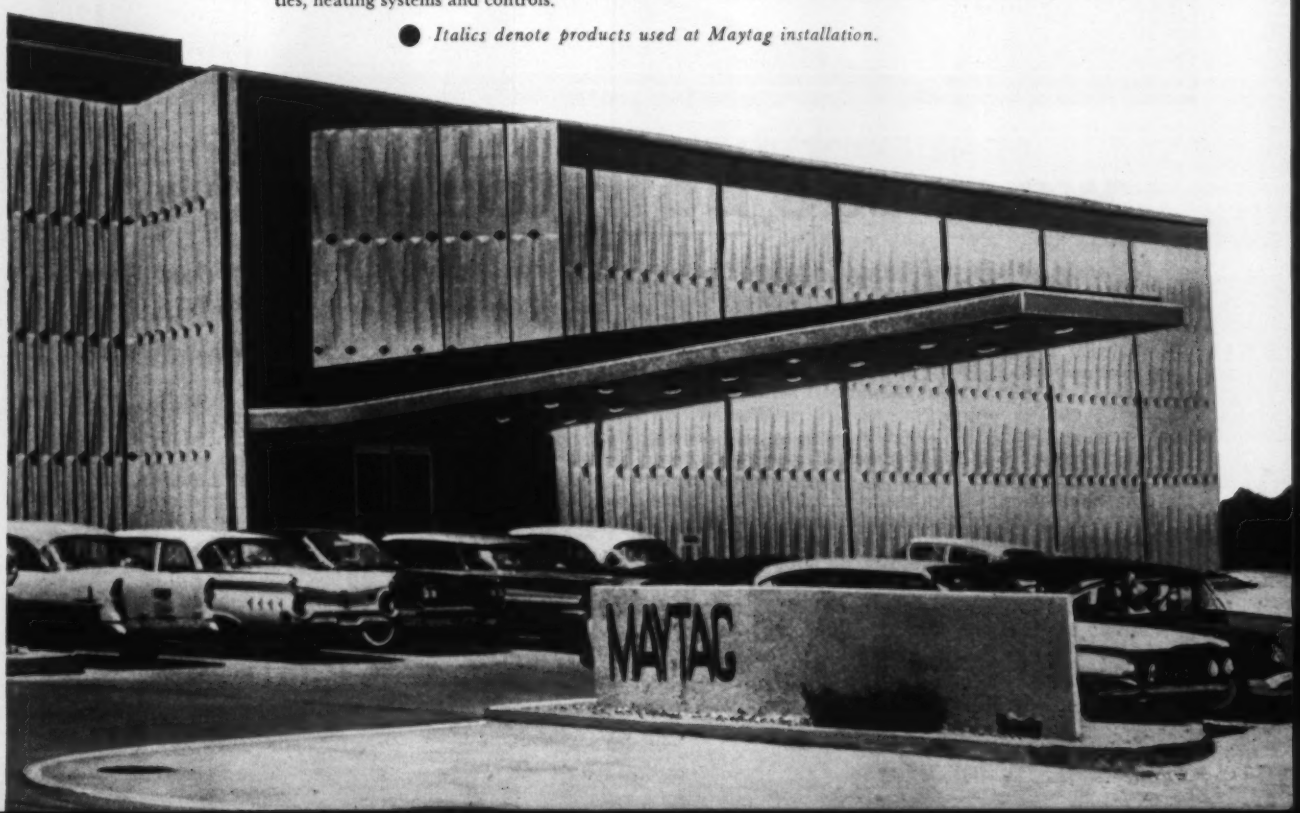
If air must do many jobs in the building you are planning, talk with AAF. Booklet 518 describes the complete line of AAF component products. If you would like a free copy, address Richard W. Smith, American Air Filter Company, Inc., 443 Central Ave., Louisville, Ky. In Canada: American Air Filter of Canada, Ltd., 400 Stinson Blvd., Montreal 9.

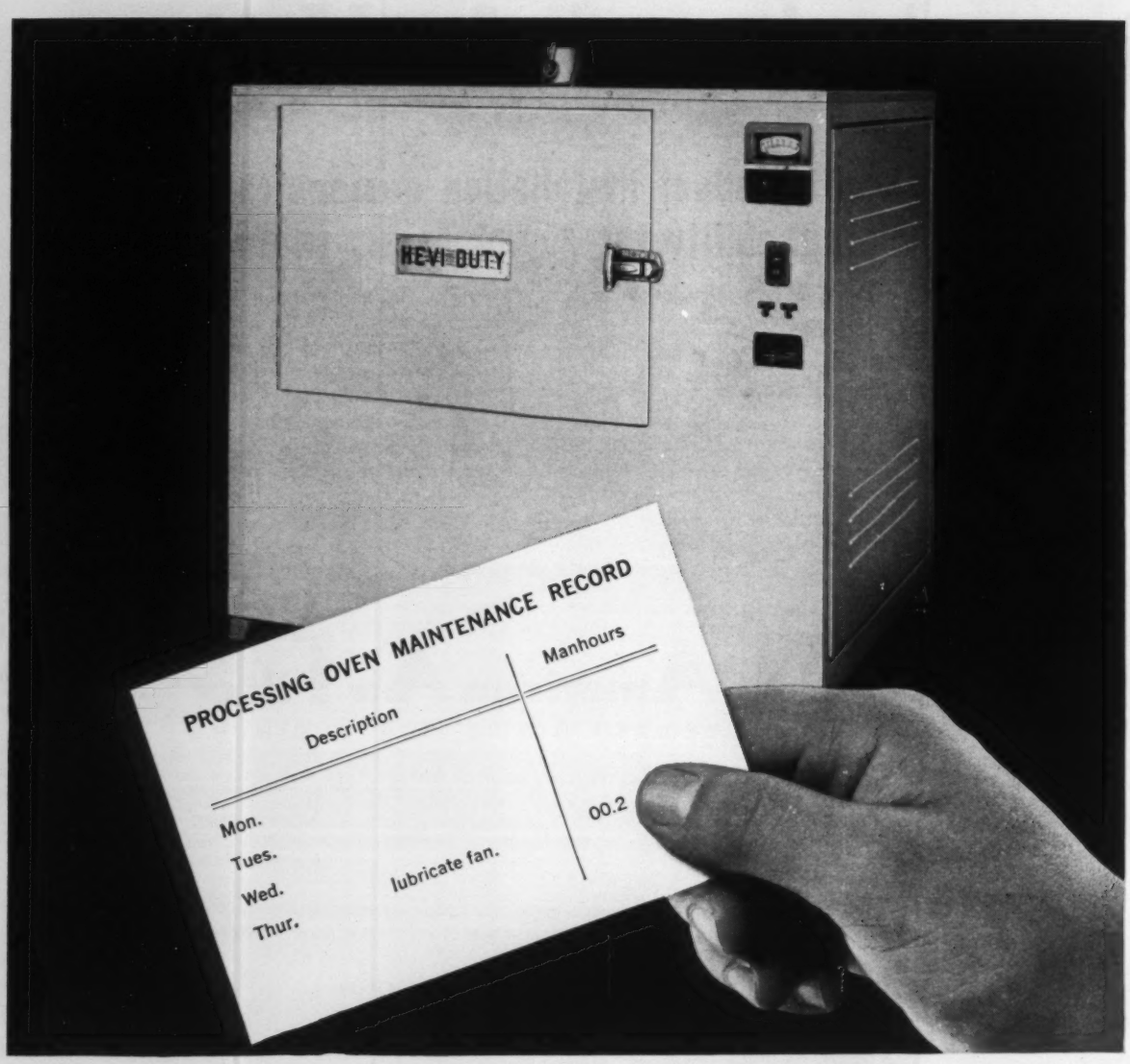
AAF **American Air Filter**

BETTER AIR IS OUR BUSINESS

AIR CLEANING: (Atmospheric Dust) *AAF electronic air cleaners, automatic air filters, unit filters,* engine & compressor filters. (Process Dust) electrostatic precipitators, *wet-type collectors, dry-type collectors,* fabric arresters. AIR CONDITIONING, HEATING & VENTILATING: Herman Nelson air conditioning unit ventilators, unit ventilators, portable heaters; Kennard/Nelson dual-duct air conditioning units, multi-zone air conditioning units, *packaged central station air handling units,* sprayed-coil dehumidifiers, fan-coil units, packaged liquid chillers, cooling towers, evaporative condensers, direct-expansion coils, water coils, steam coils, *unit blowers,* industrial exhausters, *centrifugal fans, unit heaters,* radiation products; Illinois traps, valves, specialties, heating systems and controls.

● *Italics denote products used at Maytag installation.*





we made both look better

New Hevi-Duty tray-loaded processing ovens (to 1250° F.) combine attractive appearance with easier maintenance, greater efficiency

Beneath the attractive, 14-gage steel exterior of these new ovens, you'll find a host of design refinements that simplify maintenance . . . improve efficiency and reliability.

You can get at the entire circulating and control system by releasing just one captive screw and one panel. For greater efficiency, a high-volume, cross-flow circulation pattern assures uniform heat transfer with minimum temperature drop. To simplify material handling, tray supports are spaced six inches apart. Standard trays can support a load of twenty pounds per square foot.

Another refinement: heating, control and circulation circuits are *individually* fused. Magnetic starters provide low-voltage dropout protection for electric motor circuits.

These new ovens are available in electric and gas-fired models, in temperature ranges of 600°, 850° and 1250° F. Many models are carried in stock. Request Bulletin 7101. For information on the complete line of Hevi-Duty ovens for industrial and laboratory applications in both gas-fired and electric models write Hevi-Duty, Watertown, Wis.

HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C

Hevi-Duty Electric Company, Milwaukee, Wis.

A Division of Basic Products Corporation

H-44-61

"Are the Slings You're Now Using as Pliable as this New HI-PLI?"

THIS ACCO WIRE ROPE SLING STRAIGHTENS ITSELF OUT WHEN RELEASED

- *See how flexible it is*
- *It's practically kink-proof*
- *Wrap it around heavy or irregular shaped loads —and it hangs straight again as soon as you release it*
- *It lasts longer—can be used over and over again*
- *Handles easy for it has the pliability of hemp with the strength of steel*

Yes, HI-PLI slings are amazingly pliable. This results from ACCO's arrangement of six ropes laid around one. HI-PLIS also have ACCO's patented Dualoc endings which double-lock the sling ends. They look good, too, with a clean bright finish which comes from ACCO's own Galacco coating process.

Each and every HI-PLI sling is factory proof-tested at twice its load-carrying capacity to earn an ACCO tag and certificate of registration. That means they're safe.

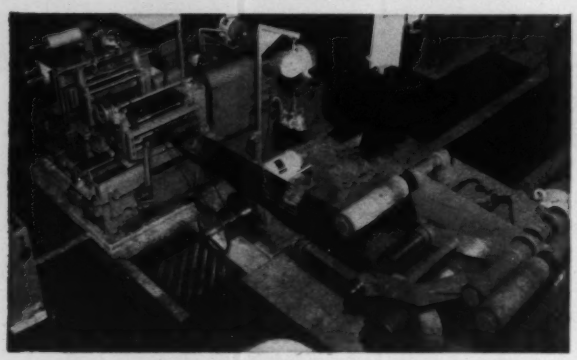
Ask your distributor for Hi-Pli slings or write us at Wilkes-Barre, Pa., for our new Bulletin **DH-5328** giving full details about the Hi-Pli Sling line.

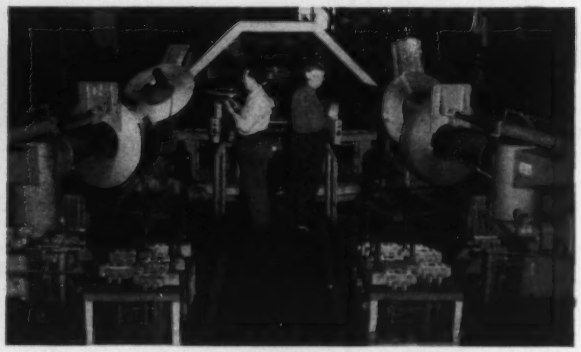
HI-PLI ACCO Registered® SLINGS

Wire Rope Sling Department • American Chain & Cable Company, Inc.

Wilkes-Barre, Pa., Atlanta, Chicago (Melrose Park), Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn. • *In Canada:* Dominion Chain Company, Ltd., Niagara Falls, Ont.

Predictable Performance...





SECO Slitting Installation, Superior Steel Division, Copperweld Steel Company, Carnegie, Pa.

is automatic—start to finish—with a SECO *Slitting Line*

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

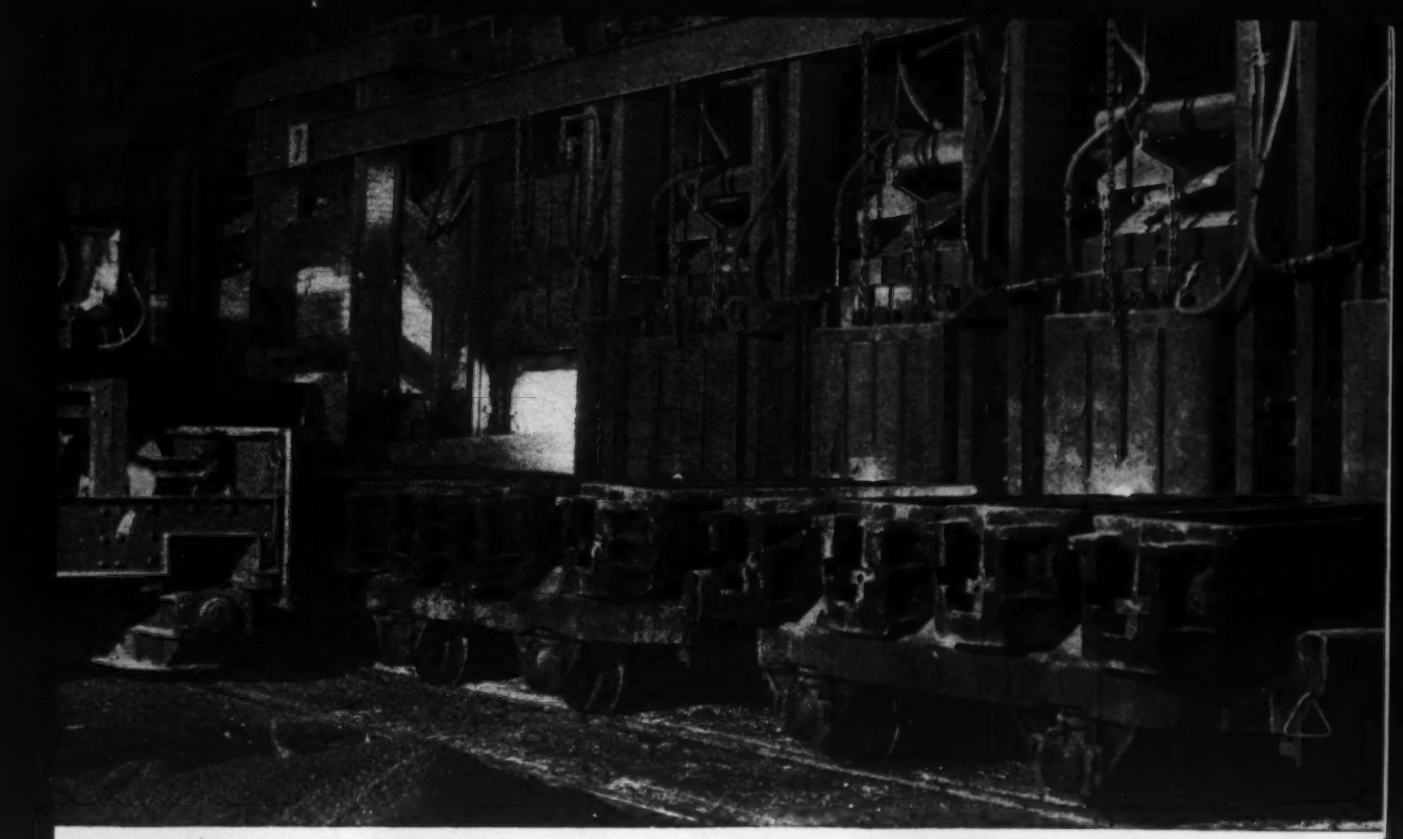
SECO

Every operation in this *complete* slitting line by SECO—from entry to exit of coils—is fully automated. It was specifically designed and built by SECO to meet the maximum performance requirements of the Superior Steel Division, Copperweld Steel Company, Carnegie, Pennsylvania.

SECO's staff of experienced sales engineers, specialists in production problem solving, are prepared to show you how you can get "predictable performance" in *your* operation—whatever your requirements. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles, California.

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO



Charging-Box Cars...

built to last by a company that uses them!

5 unique structural features make them better

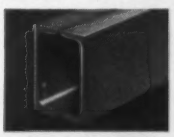
Charging-box cars have to take a lot of punishment. And, in the 40 years we have been making charging-box cars for our own use, United States Steel has developed several features in structural design that assure longer life, less maintenance, and dependable service.

As illustrated in the typical four-box car shown here, the advantages of these design features—plus the rugged durability of all-welded *rolled* steel construction—make any size USS Charging-Box Car a profitable investment.

Our representatives will be pleased to call at your convenience to discuss your requirements for this or any other type of industrial car. For more information, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

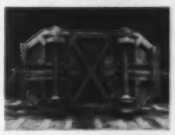
United States Steel Corporation · Columbia-Geneva Steel Division · Tennessee Coal and Iron Division · United States Steel Export Company

USS TRADEMARK **United States Steel**



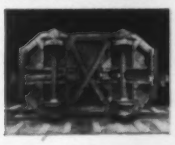
Box girder construction: Two channel sections, welded toe-to-toe, provide a frame far stronger than the ordinary angle or channel frame. This box frame is used under both the sides and ends of the car.

Double center sills: *Two* channels, back to back, run the entire length of the car. All cross members are welded to these sills, providing superior longitudinal rigidity.

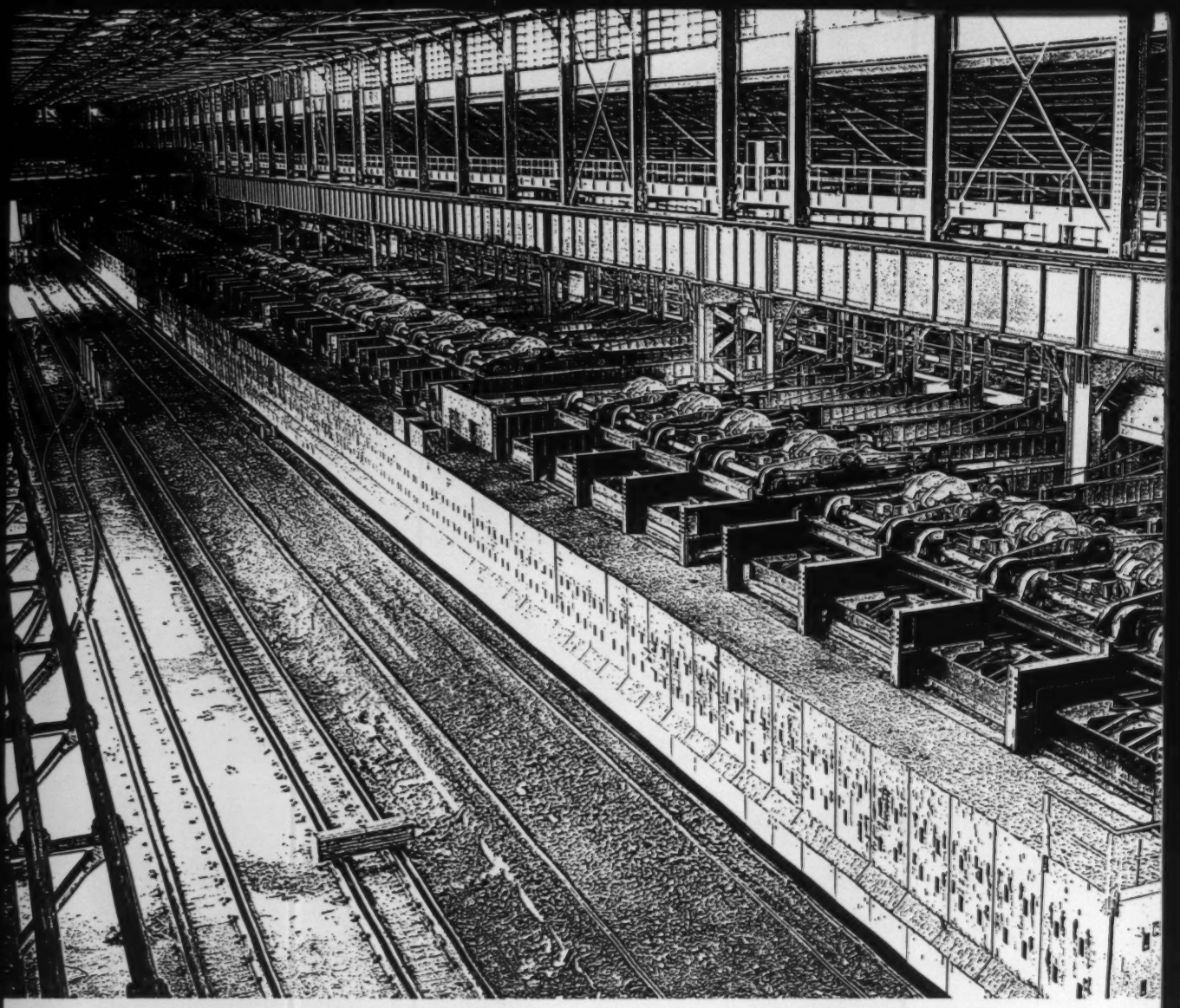


X-frame bracing: These cross braces tie the box girder frame and the center sills together for additional strength and rigidity.

Spring pockets: Over each wheel, pockets are built into the bottom of the frame and "boxed in" on all sides. Coil springs are set into these pockets. This construction permits vertical, but no lateral, movement of the springs.



Long-shanked couplers: Pivot points of couplers are *behind* each axle. This permits turning the car on a short radius curve with less wheel flange pressure than with a short-shanked coupler.



Courtesy of Gary Works, U.S. Steel Corporation

Gets them out the back door (750 tons/hr) This is the largest installation of soaking pits (48) ever built at one time. Engineered by Surface, it will heat an average of 750 tons per hour. At peak capacity, it loads the ingot buggies at a rate of 1200 tons per hour. A dual recuperator system applies the maximum amount of heat where it belongs—inside the pit. Address inquiries to 2408 Dorr St., Toledo 1, Ohio.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR

Have YOU a difficult Spring Job?

try

WASHBURN

PHOSPHATE COATED

MUSIC WIRE

114

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY

CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS

TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

An automatic coiler forms .063 Johnson tinned music spring wire into an automobile brake cylinder spring. Because this spring will spend its life in a bath of corrosive brake fluid it needs a heavy, uniform tin plating that will not peel, crack or flake. It is a critical spring with 12½ coils, held to tight tolerances and coiled with two different end sizes. The larger end is 1.034 inches while the smaller end is .710 inch.

Mid-Continent Spring Company of Ky. says . . .

Dependable Johnson Music Spring Wire Gives Precision Springs Reliability

Dependable quality and quick service are two major reasons Johnson wire is specified in Kentucky spring plant

"After 23 years in the spring manufacturing business, I'll give you my one-word description of Johnson Steel & Wire Company's spring wire . . .

"It's DEPENDABLE."

So says L. B. Langhi, president of Mid-Continent Spring Company of Ky.

And that goes for Johnson's high carbon wire destined for springs that snap into action at the critical moment of a missile launching or simply make a baby doll wink, as Mr. Langhi explains.

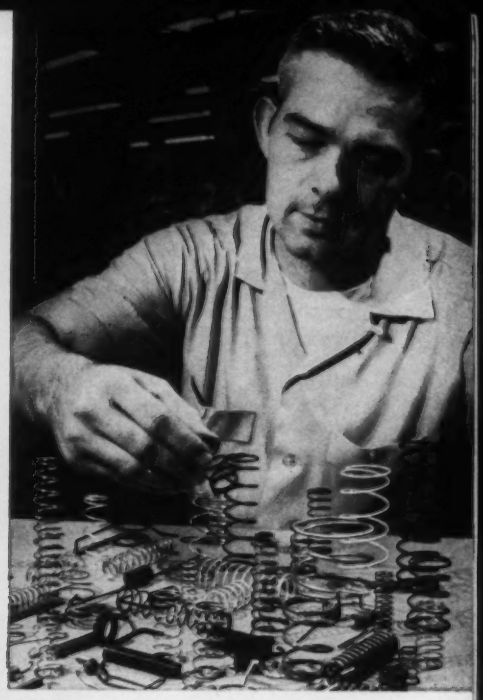
Regardless of their job, it's vitally important to Mid-Continent's customers that springs function with precision. So the firm's plant at Hopkinsville, Ky., builds reliability into all its products, whether for space flights, toys, automotive and electrical parts or vending machines.

This reliability depends as much upon the raw materials of the springs —music spring wire or oil tempered spring wire—as it does upon the skills of Mid-Continent's spring makers.

Mr. Langhi said: "Because our customers depend upon our springs to give them a full measure of value, we demand and get wire from Johnson that has a uniform quality in finish, temper, size and physical properties.

"Coatings on Johnson tin-coated

A carburetor control extension spring must be held to unvarying tolerances to insure consistent performance. This important spring is made of Johnson .010 tinned music spring wire, has an O.D. of .118 inch and measures ¾ inch outside the loops.



R. M. Worthman, purchasing agent for Mid-Continent Spring examines some of the one thousand different type springs manufactured at Mid-Continent.

This tiny vending machine extension spring is made of Johnson .013 tinned music spring wire, has .158 I.D. and 22 turns.

music spring wire are both uniform and adherent. This eliminates peeling, cracking or flaking during our coiling operation."

High physical properties, uniform cast and smooth surfaces are other important requirements since Mid-Continent springs must form within strict dimensions and carry precise work loads.

At Mid-Continent, accuracy of wire dimensions greatly affects spring coiling and performance. Close tolerances on dimensions are met consistently in fine wire specialties produced by Johnson Steel & Wire Company.

"Our production averages over a million springs per day," said R. M. Worthman, purchasing agent for Mid-Continent Spring.

"Because of this, we keep our warehouse stocked with at least 300 tons of wire. Johnson supplies us with a range of .008-inch to .207-inch music spring wire and oil tempered wire.

"Whenever our wire stock begins to deplete, we're able to call for and get fast delivery service from Johnson's mill in Worcester or from its warehouses in Chicago or Akron.

"Of the 64 different types of brake drum springs we manufacture, 90 percent of them are made of Johnson wire. That's what we think of Johnson Steel's wire."

Let Johnson start today to help you with your high carbon spring wire needs.

Just call the nearest district sales office and talk with a Johnson representative. He's ready to help you with whatever your wire and spring problems might be—right now.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

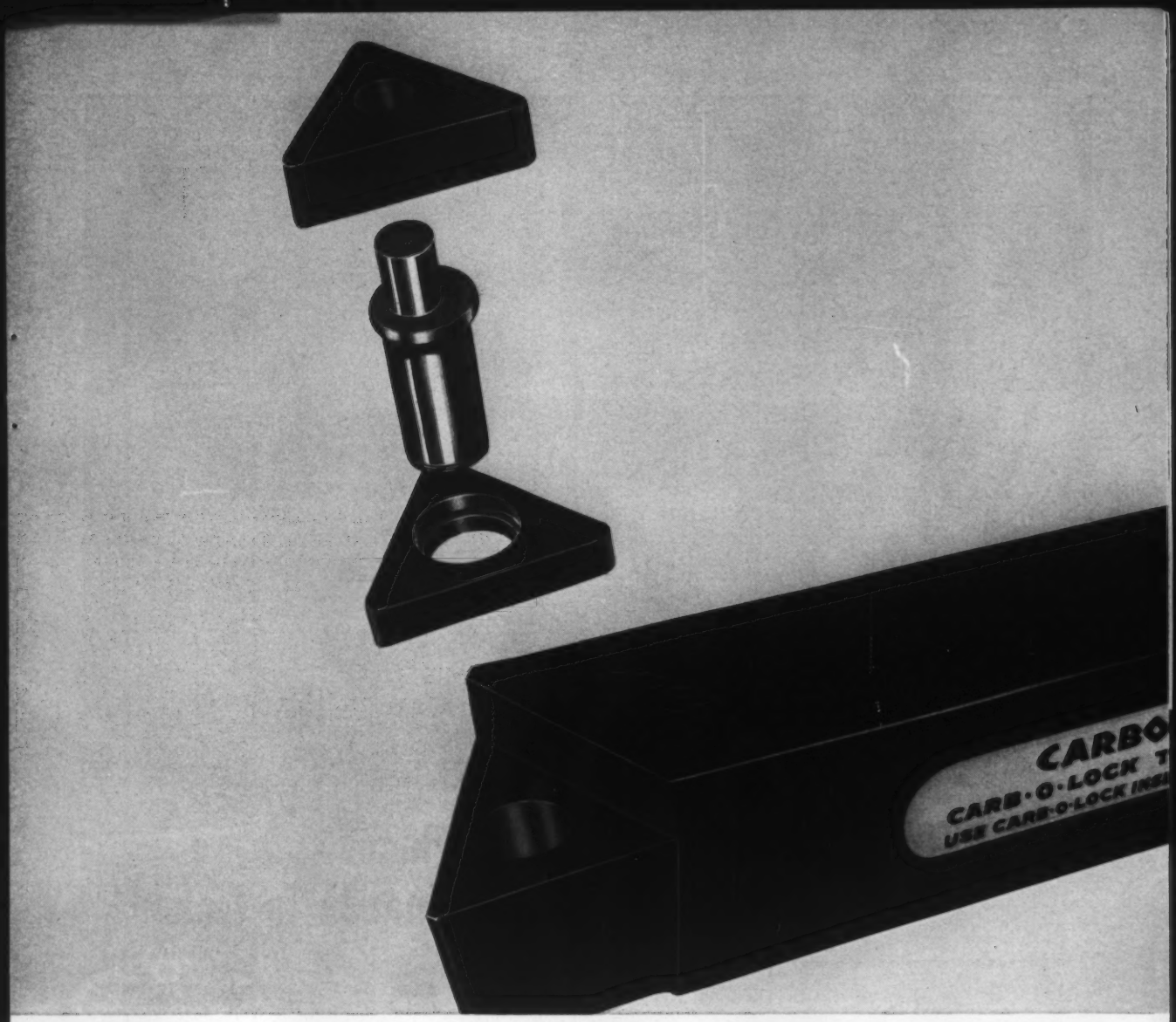
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

Steel

How to cut your disposable-tooling costs by 30 per cent at no sacrifice in quality or output. (Answer is on the next page.)



With the new Carb-O-Lock toolholder-insert combination. The single most important advance in the whole history of metal-cutting.

Save 30 per cent when you buy it. Save 40 per cent when you use it.

These are minimums. Users of the Carboloy Carb-O-Lock toolholder-insert combination have reported savings many times higher. Why?

Simple. The Carb-O-Lock design is simple. Using a cam-action locking principle, the Carb-O-Lock has just three parts (not including insert). Insert changing and indexing is a breeze; parts inventories can be held to absolute minimums. Streamlined design lets you bring the toolholder closer to your work. And less overhang means less vibration, less insert chipping and breaking.

Plus: the Carb-O-Lock gives you proven performance. A major diesel engine manufacturer discovered Carb-O-Lock allowed nearly triple the feed, eliminating two machines. A locomotive and car equipment company found Carb-O-Lock's simple, rugged design reduced time for tool changes and permitted maximum horsepower utilization.*

Carb-O-Lock inserts are available now in Grade 883 for machining cast iron, as well as many operations on the following materials: high-temperature alloys, type 300 stainless steel, brass, bronze.

So start your savings program today. Phone your Authorized Carboloy Distributor and order your Carb-O-Lock toolholder-insert combination. Save 30 per cent. And more.

Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Road, Detroit 32, Michigan.

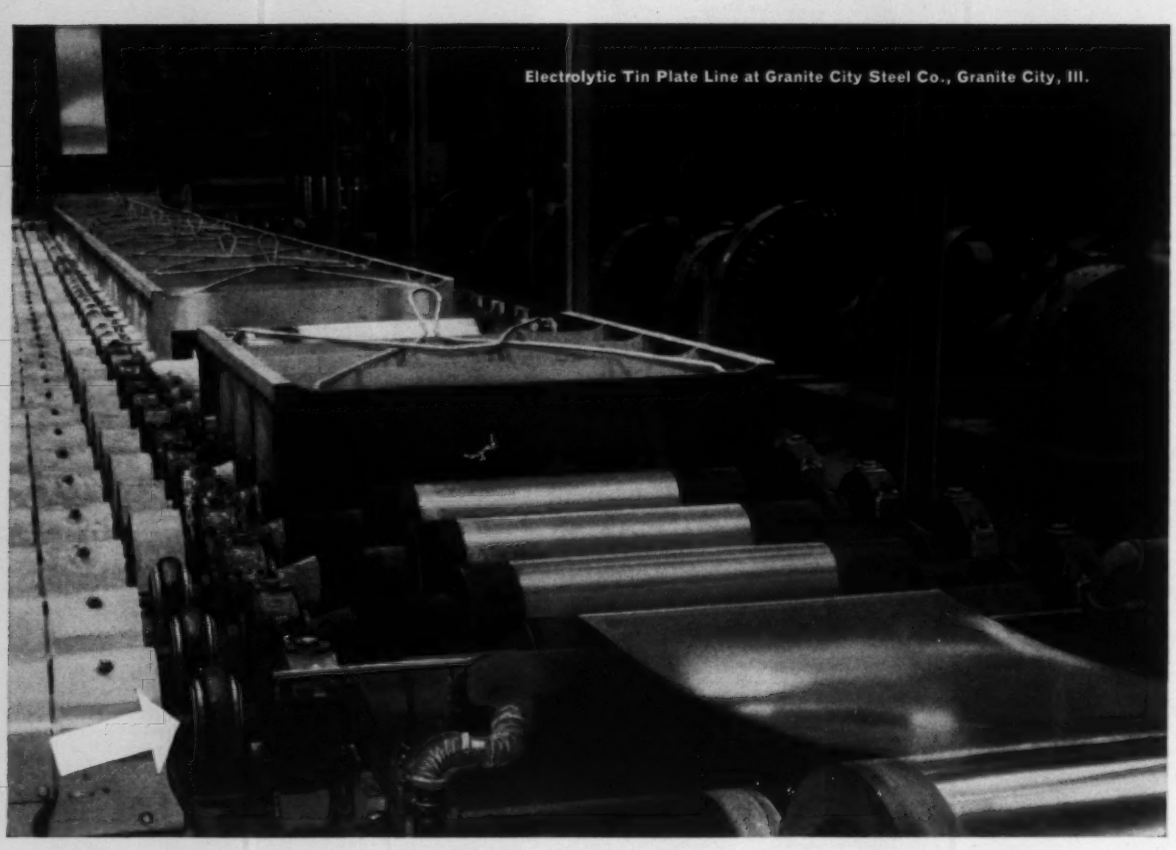
**Case histories available on request*

CARBOLOY
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

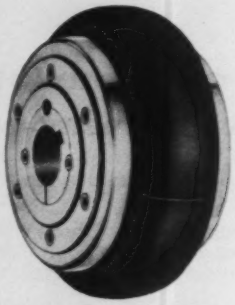
GENERAL ELECTRIC

CARBOLOY CEMENTED CARBIDE BLANKS AND DISPOSABLE INSERTS • BRAZED TOOLS • TOOLHOLDERS • CARBIDE DIES • WEAR PARTS



Electrolytic Tin Plate Line at Granite City Steel Co., Granite City, Ill.

56 Drives...56 Couplings...56 Places Where Maintenance Is Licked!



DODGE PARA-FLEX FLEXIBLE CUSHION COUPLINGS

In one steel mill operation after another, Dodge Para-flex is helping to improve the flow of production. Here 56 Para-flex Couplings contribute to a 12,000-ton-per-month capacity *without the necessity of lubrication or periodic inspection.*

During the 4 years that these amazing couplings have been used in American industry, replacements of flexing elements have been negligible. But if a change should be required, replacement is easy. On this tin plate line, for instance, the element can be replaced without removing either the reducer or the roll.

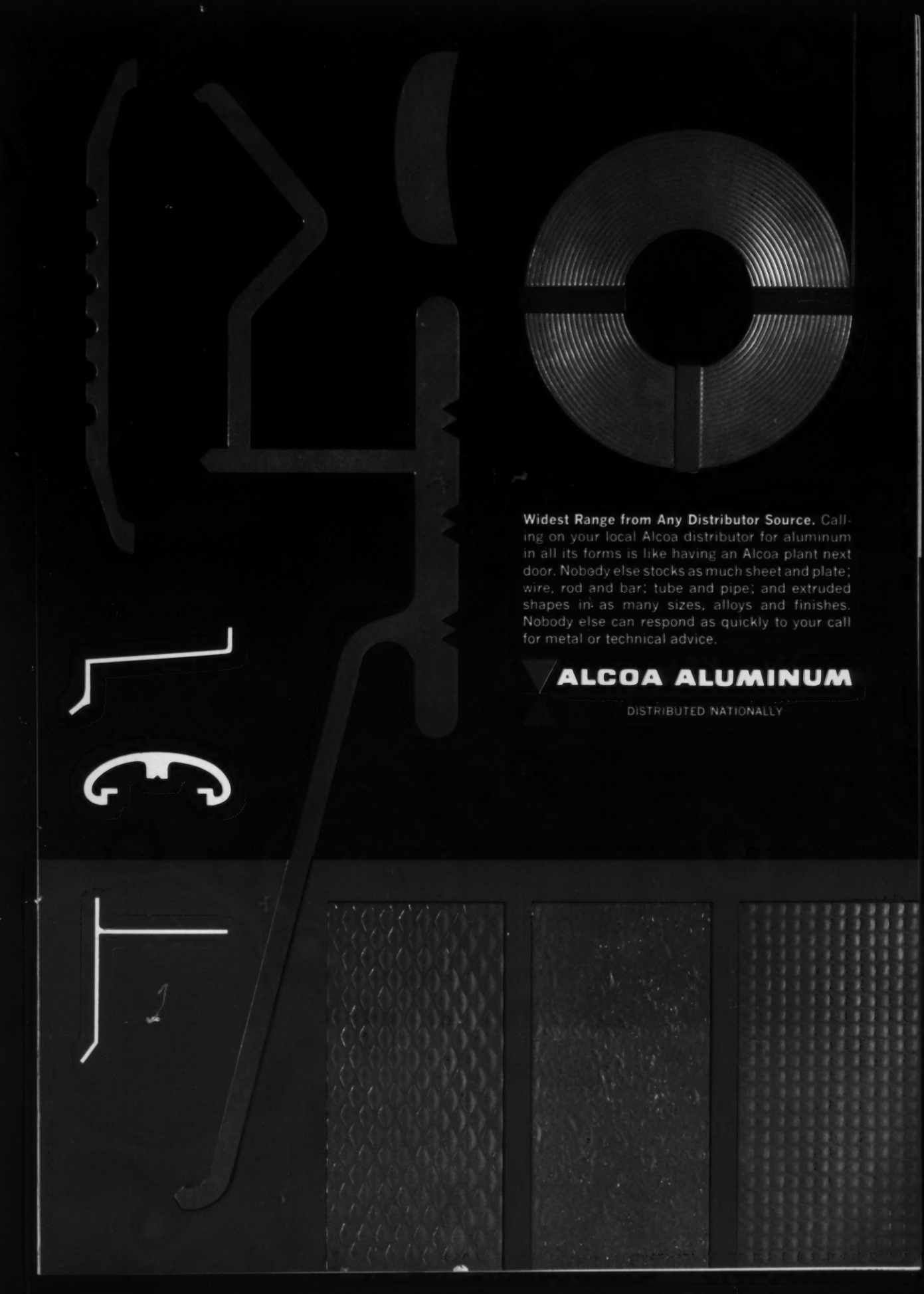
Incidentally, the hazard of arcing between motor reducers and rolls is eliminated. There is no metal to metal contact. The flexing element insulates against the flow of electrical current.

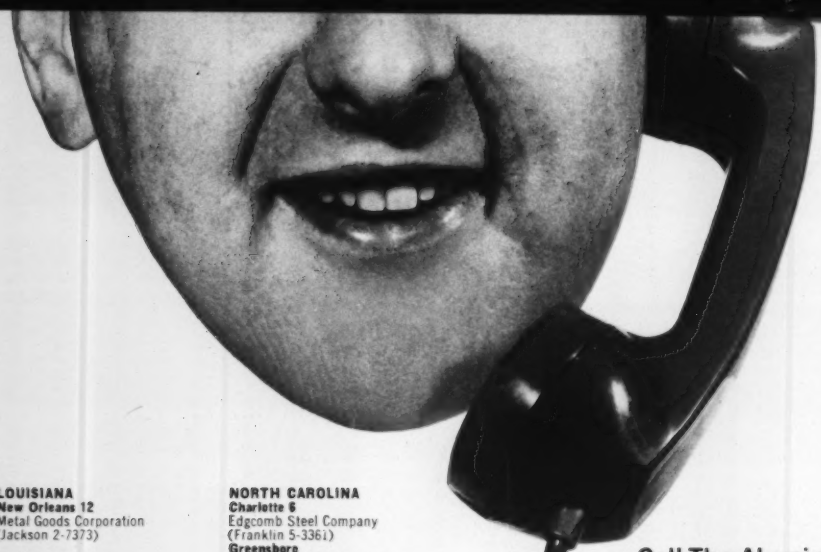
Para-flex Couplings take angular misalignment, parallel misalignment, end float or any combination of all three. They absorb vibration, cushion shock loads. Taper-Lock bushings provide "easy on—easy off" mounting. Standard types (illustrated) are made in capacities up to 3640 hp at 910 rpm. High Speed and Flywheel types are available for speeds up to 5230 rpm, and for high torque at all speeds. Ask your Dodge Distributor, or write us for complete technical bulletin.

Dodge Manufacturing Corporation, 4400 Union Street, Mishawaka, Indiana

The Products with the Pluses... **DODGE** *of Mishawaka, Ind.*

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.


Widest Range from Any Distributor Source. Calling on your local Alcoa distributor for aluminum in all its forms is like having an Alcoa plant next door. Nobody else stocks as much sheet and plate; wire, rod and bar; tube and pipe; and extruded shapes in as many sizes, alloys and finishes. Nobody else can respond as quickly to your call for metal or technical advice.
ALCOA ALUMINUM
DISTRIBUTED NATIONALLY



ALABAMA
Birmingham 5
Hinkle Supply Company, Inc.
(Fairfax 2-4541)
The J. M. Tull Metal & Supply Co., Inc.
(Fairfax 3-1612)

ARIZONA
Phoenix
Ducommun Metals & Supply Co.
(Bridge 5-4471)
Pacific Metals Company, Ltd.
(Alpine 8-7821)

CALIFORNIA
Berkeley 10
Ducommun Metals & Supply Co.
(Thornwall 1-1820)
Los Angeles 59
Benjamin Metals Company
(Rod & Bar) (Nevada 6-0611)
Los Angeles 54
Ducommun Metals & Supply Co.
(Ludlow 8-0161)
Los Angeles 22
Pacific Metals Company, Ltd.
(Raymond 3-5431)
Los Angeles 22
Tubesales (Tube & Pipe)
(Raymond 3-7781)
San Diego
Ducommun Metals & Supply Co.
(Gridley 7-3141)
San Diego 1
Pacific Metals Company, Ltd.
(Belmont 4-3253)
San Francisco 7
Pacific Metals Company, Ltd.
(Underhill 3-5600)

COLORADO
Denver 16
Marsh Steel & Aluminum Co.
(Keystone 4-1241)
Denver 16
Metal Goods Corporation
(Dudley 8-4141)

CONNECTICUT
Milford
Edgcomb Steel of New England, Inc.
(Trinity 4-1631)
Windsor
Whitehead Metals, Inc.
(Murdock 8-4921)

FLORIDA
Jacksonville 5
The J. M. Tull Metal & Supply Co., Inc.
(Evergreen 7-5561)
Miami
The J. M. Tull Metal & Supply Co., Inc.
(Oxford 6-0150)
Tampa 10
The J. M. Tull Metal & Supply Co., Inc.
(3-6741)

GEORGIA
Atlanta 2
The J. M. Tull Metal & Supply Co., Inc.
(Jackson 5-3871)

HAWAII
Honolulu 14
Aluminum Products Hawaii, Ltd.
(94-861)

IDAHO
Boise
Pacific Metal Company (3-6468)

ILLINOIS
Chicago 80
Central Steel and Wire Company
(Republic 7-3000)
Chicago 80
The Corey Steel Company
(Bishop 2-3000)
Chicago 23
Steel Sales Corporation
(Bishop 7-7700)

INDIANA
Indianapolis 18
Steel Sales Co. of Indiana, Inc.
(Liberty 6-1535)

KANSAS
Wichita
Marsh Steel & Aluminum Co.
(Whitehall 2-3231)

KENTUCKY
Louisville 3
Williams and Company, Incorporated
(Juniper 3-7781)

LOUISIANA
New Orleans 12
Metal Goods Corporation
(Jackson 2-7373)

MARYLAND
Baltimore 7
Whitehead Metals, Inc.
(Windsor 4-2000)

MASSACHUSETTS
Boston 19
Eastern Metal Mill Products Co.
(Highlands 2-5900)
Cambridge 39
Whitehead Metals, Inc.
(Trowbridge 6-4680)

MICHIGAN
Detroit 12
Central Steel and Wire Company
(Twinbrook 2-3200)
Detroit (Hazel Park)
Meier Brass & Aluminum Co.
(Jordan 6-3902)
Detroit 10
Steel Sales Co. of Michigan
(Tyler 6-3000)

MINNESOTA
Minneapolis 13
Steel Sales Co. of Minnesota
(Sterling 1-4893)

MISSOURI
North Kansas City 16
Marsh Steel & Aluminum Co.
(Grand 1-3505)
North Kansas City 16
Metal Goods Corporation
(Grand 1-3516)
St. Louis 14
Metal Goods Corporation
(Harrison 7-1234)
St. Louis 10
Steel Sales Co. of Missouri, Inc.
(Prospect 1-5255)

NEW HAMPSHIRE
Nashua
Edgcomb Steel of New England, Inc.
(Tuxedo 3-7731)

NEW JERSEY
Elizabeth
Adam Metal Supply of New Jersey
(Flanders 1-2550)
Englewood
Tubesales (Tube & Pipe)
(Lowell 7-4400)
Harrison
Whitehead Metals, Inc.
(Humbolt 5-5900)
Hillside 5
Miller Steel and Aluminum
Division of Robert Campbell Co., Inc.
(Waverly 6-6000)

NEW YORK
Buffalo 5
Brace-Mueller-Huntley, Inc.
(TR 7-8700)
Buffalo 7
Whitehead Metals, Inc.
(TR 6-3100)
New York (Long Island City 1)
Adam Metal Supply
(Stilwell 6-7737)
New York (Brooklyn)
Strahs Aluminum Company, Inc.
(Browning 2-7000)
New York 14
Whitehead Metals, Inc.
(Watkins 4-1500)
Rochester 5
Adam Metal Supply of Rochester
(Locust 2-4260)
Rochester 1
Brace-Mueller-Huntley, Inc.
(Congress 6-6560)
Rochester 10
Whitehead Metals, Inc.
(Butler 8-2141)
Syracuse 1
Brace-Mueller-Huntley, Inc.
(Howard 3-3341)
Syracuse 1
Whitehead Metals, Inc.
(Howard 3-6241)

NORTH CAROLINA
Charlotte 6
Edgcomb Steel Company
(Franklin 5-3361)
Greensboro
Edgcomb Steel Company
(Broadway 5-8421)

OHIO
Cincinnati 14
Central Steel and Wire Company
(Avon 1-2230)
Cincinnati 37
Williams and Company, Incorporated
(Valley 1-5555)
Cleveland 28
A. M. Castle & Co.
(Axminster 2-7600)
Cleveland 14
Williams and Company, Incorporated
(Utah 1-5000)
Columbus 12
Williams and Company, Incorporated
(294-1623)
Toledo 12
Williams and Company, Incorporated
(Greenwood 5-8861)

OKLAHOMA
Tulsa 13
Metal Goods Corporation
(Temple 6-2561)

OREGON
Portland 9
Pacific Metal Company
(Capitol 7-0693)

PENNSYLVANIA
Philadelphia 34
Edgcomb Steel Company
(Garfield 3-6300)
Philadelphia 33
Metal Supply Company
(Center 6-0220)
Philadelphia 40
Whitehead Metals, Inc.
(Baldwin 9-2323)
Pittsburgh 33
Williams and Company, Incorporated
(Cedar 1-8600)
York
Edgcomb Steel Company (47-1931)

RHODE ISLAND
Slatersville
Edgcomb Steel of New England, Inc.
(Poplar 7-0900)

SOUTH CAROLINA
Greenville
The J. M. Tull Metal & Supply Co., Inc.
(Cedar 3-8366)

TENNESSEE
Memphis 6
Metal Goods Corporation
(Whitehall 8-3407)

TEXAS
Dallas
McCormick Steel Company
(CH 7-3104)
Dallas 35
Metal Goods Corporation
(Fleetwood 1-3271)
Houston 1
McCormick Steel Company
(OR 2-6671)
Houston 1
Metal Goods Corporation
(Riverside 7-1110)

UTAH
Salt Lake City 1
Pacific Metals Company, Ltd.
939 South 6th West
(Davis 8-2222)

WASHINGTON
Seattle 8
Ducommun Metals & Supply Co.
(Parkway 5-1500)
Seattle 4
Pacific Metal Company (Main 2-6925)
Spokane 4
Pacific Metal Company
(Keystone 5-3681)

WISCONSIN
Milwaukee 1
Central Steel and Wire Company
(Humboldt 1-5000)
Milwaukee 9
Steel Sales Co. of Wisconsin
(Hilltop 2-2020)

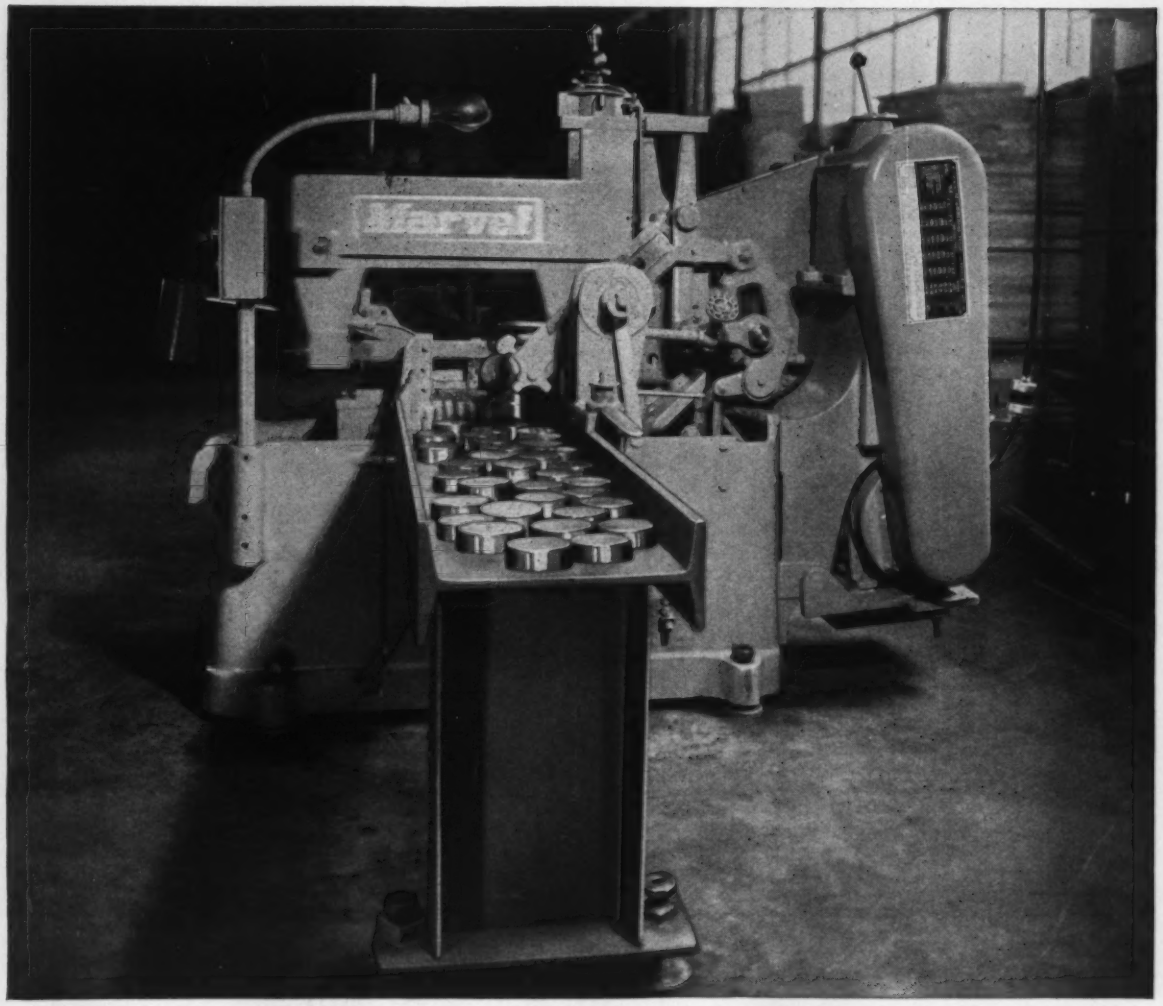
Call The Aluminum Man . . . his stock's the most complete!

Your Alcoa distributor sales representative—*The Aluminum Man*—maintains a warehouse bulging with sheet and plate; tube and pipe; extruded shapes; wire, rod and bar. His stock represents the widest range of aluminum products available from any distributor source. He can arrange for them to be slit, sawed or sheared to your specifications—furnish technical advice you may need on alloy selection and fabrication techniques. He's your fastest supply line for aluminum in any form when you need it. Your nearest Alcoa distributor is listed on this page, so give him a call . . . soon. Aluminum Company of America, 845-L Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

DISTRIBUTED NATIONALLY

Call *The Aluminum Man* . . . he's your Alcoa distributor sales representative



Payoff End of a Production Marvel

A cut-off saw's value is proven at the discharge end of the machine. How quickly the trough is filled with accurately cut-off pieces can mean the difference between profit and loss on many jobs.

The R. J. Sudrick Co., Des Plaines, Illinois, manufacturers of precision aircraft components had to cut-off 4600 blanks from 3¼" round, 303 Stainless Steel Bars.

They bought our MARVEL No. 6A4 High Speed Heavy Duty Automatic Bar Feed Hack Saw Machine; used MARVEL High-Speed-Edge Hack Saw Blades, and got the high production, accuracy and economy they desired.

PRODUCTION? Constant at 20 pieces per hour floor to floor

ACCURACY? Held well within the permissible tolerance of +.010 —.000

BLADE COST? Just 1½¢ per cut. Only twenty-three MARVEL blades were needed to make the 4600 cuts, and not a single blade failure due to blade breakage. MARVEL High-Speed-Edge Blades are unbreakable.

The point is this: MARVEL Metal Cutting Hack Saws equipped with MARVEL High-Speed-Edge Hack Saw Blades are an unbeatable combination for economical, accurate and safe cutting-off.

If your hack saws are not producing the economy you need to meet today's competition, try MARVEL High-Speed-Edge Blades. They will give you the competitive edge every time. Write for Catalog C-85 which has the complete story on MARVEL Hack Saws and Band Saws, Hack Saw Blades and Band Saw Blades.

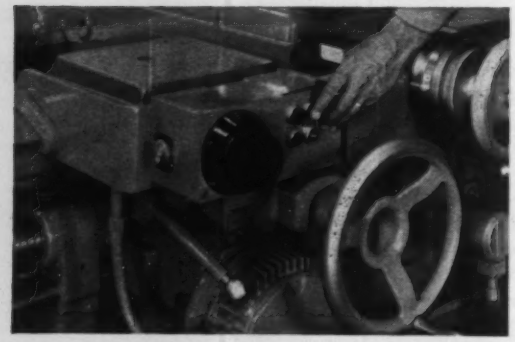
ARMSTRONG-BLUM MFG. CO.

5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

MARVEL Metal Cutting SAWS

Better Machines-Better Blades

"The next Heavy Duty lathe we buy will be a LeBlond—equipped with Servo-Shift!"



Why make the operator tug on levers when the push of a button will do the shifting easier and better?

Why make the operator calculate cutting speeds (if he ever would) when the spin of a dial will calculate them better—and preselect the next speed too?

Why waste the operator's time running to the headstock, when he can pick his rpm or fpm and shift gears right at the apron?

Only cutting time makes money. That's why it makes sense, putting Servo-Shift on a big LeBlond!

You can have time saving, money making Servo-Shift, on any of these new Heavy Duty LeBlonds:

40 hp, 2516 and 3220, NF design
. . . write for bulletin 561-B

50 hp, 3220, NI design
. . . write for bulletin 861-B

75 hp, 4025, NK design
. . . write for bulletin 461-B

THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio
World's Largest Builder of a Complete Line of Lathes

LEBLOND

Engineering: Why Give It Away?

A builder of special machinery tells us this story: He was invited by an automaker to bid on a piece of equipment. Its estimated cost was $44,000. The submission of a proposal required more than the usual engineering work. Sales and engineering costs were slightly more than $2000. But the builder needed orders badly and figured $2000 wasn't too much to gamble. He expected there would be three or four other bidders and that his chances of getting the job were pretty good. When the bids were opened, he found that 31 other manufacturers were competing. Presumably, their proposal costs were as great as those of our friend. Collectively, the 32 companies may have spent $64,000 in bidding for a $44,000 job.

Our friend, who did not get the job, is pretty bitter. And so are many other suppliers of special equipment who have invested substantial sums in "wasted" engineering.

A year ago, Brown & Sharpe announced they would charge $15 for each engineering proposal involving cams, tooling, or special attachments for automatic screw machines.

Results?

Requests for proposals dropped sharply after the charge was initiated. Inquiry volume this year is only one-third of last year's. (See Page 166.)

But the company's dollar volume of orders is nearly four times last year's.

Last year, less than 7 per cent of quotations (in dollar volume) were translated into orders. This year, the rate is up to 70 per cent.

Brown & Sharpe people service inquiries much faster than they used to—generally within one week vs. six weeks or more before the nominal engineering charge was initiated.

Finally, there have been no complaints from customers.

We suspect the Brown & Sharpe's experience will encourage other manufacturers to charge for engineering proposals.

Walter J. Campbell

EDITOR

4-piece assembly replaced by one aluminum extrusion

Hundreds of manufacturers have taken a fresh look at their products. In doing so, they have discovered that extrusions like the one shown can now cut down on hand labor and replace costlier assemblies . . . or replace rolled, crimped, welded or machined parts.

Production techniques and aluminum alloys have improved rapidly. So it takes a specialist—an experienced independent extruder—to keep you up to date with all the cost-saving possibilities that extrusions now offer. To be sure you're taking advantage of possible cost savings, have a nearby extrusion specialist analyze your product line promptly.

It's good business to know one of these independent extruders . . . specialists who are supplied with top-quality aluminum ingot by Aluminium Limited.

...and then there was one:

MAIL THIS COUPON FOR EXTRUDER NAMES AND ADDRESSES.

Aluminium Limited Sales, Inc., Dept. S-1113
111 W. 50th St., New York 20, N. Y.

Please send me a list of Independent Extruders in this area.

Name_____

Title_____

Company_____

Address_____

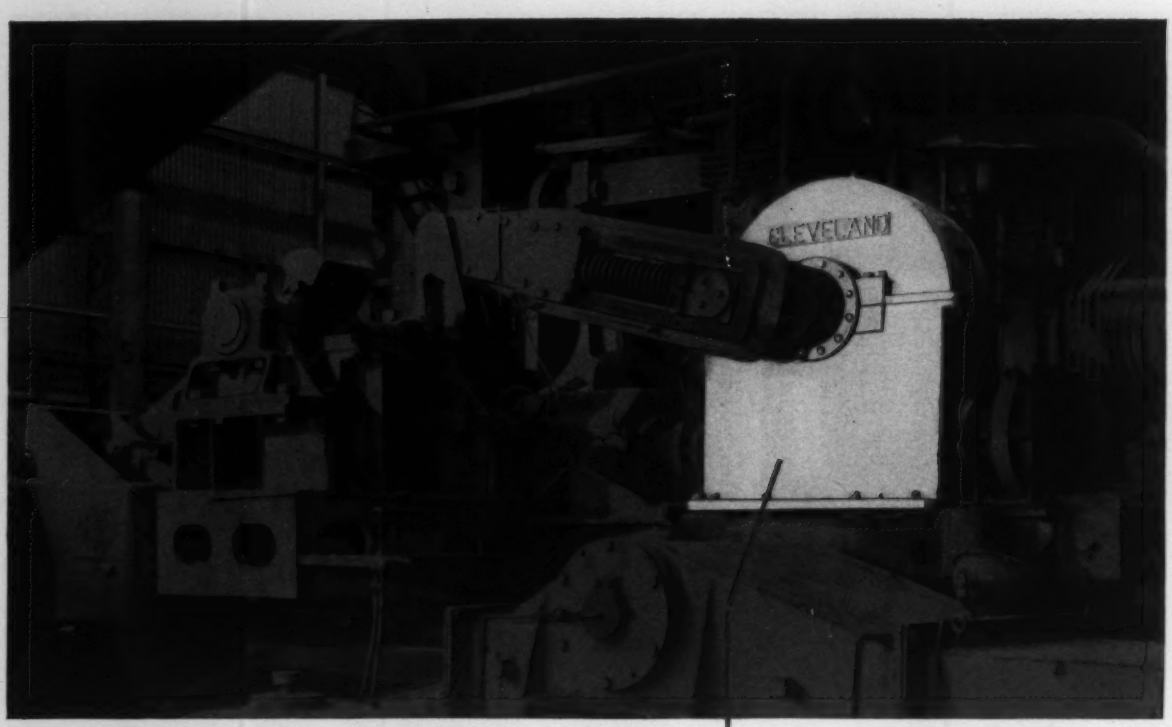
City_____ State_____

ALCAN Supplying metal and ideas to companies that work with aluminum

ALUMINIUM LIMITED

Aluminium Limited Sales Inc., 111 W. 50th St., New York 20, N. Y.

The rolled section in the top illustration is in four parts with several fasteners and two welds. It was replaced by the single aluminum extrusion below with great savings in time and labor.

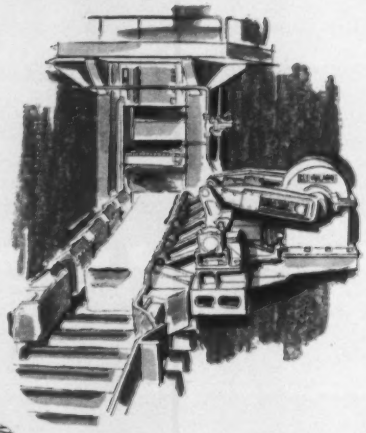


Two Cleveland Speed Reducers drive "Magic Fingers" on Kaiser Steel's New Slabbing Mill

Here's one of two rugged 3000-AT Cleveland Worm Gear Speed Reducers busy at work driving the manipulator finger lift mechanism on Kaiser Steel Company's new 45 x 90-inch Universal Slabbing Mill at Fontana, California. With these Cleveland Reducers, mounted on the slab pusher, turning massive slabs between mill passes is a simple, rapid operation.

In these large, yet compact, space-saving Clevelands, worm and gear shaft bearings are supported by a massive internal structural framework that enables the units to withstand extreme shock loads. Their right angle shaft arrangement provides a distinct advantage over other forms of gearing that might not fit the space limitations of a specific installation.

In all types of industrial plants, wherever rugged, compact and dependable speed reducers are needed, Clevelands handle the toughest assignments. Call your Cleveland Representative today, or write for Bulletins 145 and 410-A to get complete information on how to handle your most demanding power transmission jobs.



Cleveland Worm & Gear Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

CLEVELAND
Worm Gear
Speed Reducers

Kennedy Faces a Tough Decision

Rising protectionist sentiment in the U. S. has made the President think twice about the extension of the Reciprocal Trade Agreements Act. He will have these choices when the decision must be made next year:

1. **Let it die.** Its death would not affect present tariff structures.

2. **Request an extension of only one year,** promising Congress that the situation will be thoroughly reviewed and the needs of domestic industry taken into account in a new approach to be recommended in 1963.

3. **Go all out for a long extension of the act** (which the President personally prefers) and attempt to beat off protectionist attempts to load the legislation with amendments calling for increased tariffs and stiffer quotas on some imports.

4. **Request a moderate extension of three years,** offering the protectionists a "trade adjustment" principle in return—technical advice and loans would be offered to domestic industries harmed by imports. In effect, new jobs would be created for workers losing jobs because of imports.

Reciprocal Trade Hassle Looms

THE RECIPROCAL TRADE ACT comes up for renewal next year, and the Kennedy administration has started its most serious effort to influence public opinion on a domestic issue. President Kennedy is out to convince the public, particularly labor and management, that import barriers should be lowered.

Since 1962 will be an election year, Congress will also get into the act. It will be closely watching for signs of public sentiment for or against liberal trade policies; so far, the legislators themselves have been exhibiting protectionist sentiments in response to certain local pressures—lead and zinc subsidy legislation last session is an example.

• **What It Means to You**—Most metalworking firms have a stake in the trade act. Since 1955, more than 50 industries have argued before the Tariff Commission or the OEP (the Office of Emergency Planning, formerly Office of Civil & Defense Mobilization) for some form of relief from imports. OEP cases involve requests for protection on the ground that the damaged domestic industry is necessary to national security; Tariff Commission cases most often involve the "escape" clause.

It provides that either party to a trade treaty may withdraw concessions if the article is being imported in quantities likely to seri-

ously damage domestic producers.

Escape clause cases before the commission have resulted in 124 investigations—100 have been completed. (In several instances, more than one investigation has been done for one industry.) In the last 15 years, favorable reports were sent to the President on 28 cases; the President has chosen to invoke the escape clause only 13 times. Metalworking has received favorable treatment six times (watches, bicycles, spring clothespins, safety pins, lead and zinc, and stainless steel table flatware).

• **Barriers to Our Exports** — The basic argument for free trade is that commerce is a two-way street. It runs: We must allow imports to keep our exports at a high level.

In some instances, barriers to U. S. exports are troublesome. Here are examples:

Belgium - Luxembourg — Common Market countries receive special treatment (the U. S. doesn't) on some items, including automobiles.

Burma—Some equipment imports are reserved for Japan. Red China supplies many lines of machinery and equipment under long term, bilateral agreements.

Canada—Used aircraft may not be imported. Second-hand automobiles manufactured prior to the year of import may not come in. Imports of atomic energy products are controlled.

Ceylon—Import restrictions on radios, electrical appliances, and automobiles have been tightened.

Denmark—Some licensing requirements for industrial goods are maintained.

France—Diodes, certain trucks and tractors, and aircraft and parts come in under quotas.

India—Machinery for small scale industries is coming from countries with which India has special trading arrangements, so the U. S. is discriminated against. Imports of machinery and equipment for larger new industries are limited to projects covered under long term credit arrangements from abroad.

Indonesia—Tin plate and reinforcing steel may be imported only by government owned trading agencies.

Italy—Imports of printing machinery and motor vehicles are subject to licensing, high duties, and taxes.

New Zealand — Discriminatory licensing requirements are set on motor vehicles and parts from the U. S.

Sweden — Automobiles, chassis, and bodies are subject to licenses.

Switzerland—Motor buses and trucks require licenses for import.

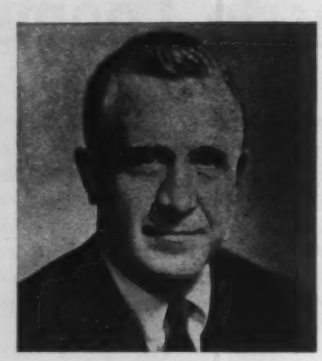
How Two Metalworkers View Tariffs and Trade

Richard F. Sentner, executive vice president-commercial, U. S. Steel Corp.:

"It is impossible to isolate our domestic market from the rest of the world. The steel industry in America, for example, could not exist as we know it today without world-wide freedom of trade—especially in raw materials. . .

"We must compete in quality, in service, and in technology. . .

"People who think they can build a (tariff) wall around their own prosperity, and protect it forever from the bracing winds of competition from without, are only deluding themselves and stopping their progress while the rest of the world passes by them."



Carl J. Gilbert, chairman, Gillette Co.:

"As young nations start to industrialize, we must become their customers, and they must become ours. To do this successfully, we must resist restrictionism in our own country and work for the reduction of barriers elsewhere. . .,

"Rather than complain about foreign competition and ask for artificial protections against imports, should we not take a good look at world markets? . . .

"The decisions we make on foreign trade next year and in the years that follow will be fundamental elements in our strategy for survival. These decisions, often of seemingly minor importance, can undermine a friendly government or strengthen the hand of Communism. . . "

Tunisia—To protect growing domestic industries, the import of certain aluminum and iron products and battery parts is prohibited.

Turkey—Refrigerators and household appliances ordinarily can't be imported.

United Kingdom—There are several restrictions on imports of large airplanes, arms and ammunition.

Venezuela — Licensing requirements and quotas are used against the import of certain radio and television sets, passenger automobiles, cameras, phonographs, and records.

• **President's Answer**—In facing up to the trade barriers against U. S. exports, the President points out that "quantitative import controls today tend to be related to levels of economic development." Industrial countries generally maintain restrictions on some commodities; less developed countries have balance of payments problems and seek to protect their young industries.

The President reports that in 1960 progress was made toward the relaxation and elimination of quantitative import restrictions of many countries. Much of the work takes place with the nations participating in the General Agreement on Tariffs & Trade (GATT). Representatives of the 38 member nations and observers from many other countries recently attended a meeting aimed at reducing balance of payments restrictions.

George W. Ball, under secretary of state for economic affairs, outlines the administration's hopes:

• To help control inflation in the U. S. (thus keeping ourselves from being priced out of world markets), we must "repudiate" protectionism.

• Managerial imagination and initiative will be required by domestic industries unable to compete with imports. Possible tactics include new designs, use of new materials, and the elimination of lines that can't compete with imports.

• In exceptional cases, the federal government will provide assistance to depressed industries to speed the transfer of labor and capital into more productive channels. Proper aids will include the accelerated amortization of obsolescent machinery, loans for modernization, and funds for retraining and relocating workers.

Howard C. Petersen: He Will Listen To All Sides

To firm the administration's approach to foreign trade policy and help guide it through Congress next year — that's Howard C. Petersen's job as special assistant to the President.

He and four assistants will listen to pleas from all quarters—free traders and protectionists, industry and labor, the departments and agencies of government—then, recognizing the realities of political life, will determine the tactics for renewing the Reciprocal Trade Agreements Act.

Where does Mr. Petersen stand on the issue?

His aides say it is too early for him to comment, that the administration's policy is not yet established.

Before coming to Washington, he was president of Fidelity-Philadelphia Trust Co., Philadelphia, and vice chairman of the Committee for Economic Development.

Speaking to the German Group of the European Committee for Economic & Social Progress, Mr. Petersen said, before joining the administration:

- **"The basic requirement . . . is a substantial, gradual, general reduction of tariffs and other barriers to trade by all the advanced, free countries . . . The cuts must be general to assure their effectiveness. The reductions should be gradual to provide affected industries with time for adjustment."**
- **"I believe it is the responsibility of each country (in a trade group such as the Common Market) so to manage its own affairs as to reduce the potential hardships for any particular sector within it that may result from policies undertaken for the benefit of the whole (trade group)."**
- **". . . Countries sufficiently close to the frontiers of modern technology, sufficiently supplied with skilled personnel, sufficiently able to generate and attract capital . . . respond much better to the brisk winds of competition than to the hothouse atmosphere of protection."**

• **What's Ahead?**—GATT negotiations are on an item-by-item basis. Mr. Ball believes the President should have the authority to negotiate for the reduction of tariffs and trade restrictions in terms of across-the-board cuts.

He thinks that such a system will be necessary because "no one can gage precisely where U. S. export opportunities may emerge."

He foresees a time when nearly 90 per cent of the Free World's trade in industrial products will be concentrated in two great Common Markets—the 300 million people of Europe and the 180 million people of the U. S.

• **Common Market Challenge**—The European Economic Community already has learned to retrain and relocate workers and channel new investment into depressed areas, warns Howard C. Petersen, special assistant to the President. He admits that quantitative restrictions against U. S. exports remain; in fact, the Common Market has discriminated against the U. S., putting a stumbling block in the way of further U. S. trade liberalization. Industries hardest hit by Common Market discrimination include chemicals, office machinery, and motor vehicles. Mr. Petersen has said there is a strong case for some initial, uncompensated reduction of tariffs by the Common Market.

A connected problem is the rush of U. S. firms to build plants inside the Common Market. Some Washington sources are predicting that exports of U. S. products abroad next year will not go above this year's $19.5 billion but that sales of U. S. plants abroad will rise. In a sense, they say, overseas movements must be slowed to give domestic exporters a chance to take advantage of new markets overseas. Treasury Secretary Douglas Dillon's efforts this year to increase taxes of U. S. subsidiaries abroad reflects that attitude in part.

Public Relations Takes Aim

MANAGEMENT is relying more and more upon the deft and direct techniques of the public relations (PR) man to sell a company and its products to specific areas of the public.

One of the most significant developments, claim PR executives, is the recognition by management that public relations is no longer a luxury, "window dressing" activity. Industry has new respect for what solid public relations planning and results can do to support marketing, sales, and other corporate interests.

• **Ringing Up Sales**—Public relations can ring the cash register, says Edward Gottlieb, president, Edward Gottlieb & Associates Ltd., a PR firm with headquarters in New York and offices in Washington, Chicago, Los Angeles, and Paris.

PR efforts go beyond the issuance of news releases. In assisting the manufacturer of a pressure measuring device, Gottlieb specialists went to hospital authorities and technicians to explain the product. The hospital people recognized the importance of the equipment; they weren't sure how they could use it, but research was initiated as a result of Gottlieb's introductions.

For another client, Motec Industries Inc. (formerly Minneapolis-Moline Co.), Hopkins, Minn., Gottlieb has opened marketing doors in Washington and Europe. Says Motec's president Edmund F. Buryan: "Public relations is an important arm of our marketing operations. Our agency has helped us develop our new product contacts in this country and overseas. It was able to put us in direct contact with certain manufacturers in Europe."

• **PR on Target**—Ray J. Waterkotte, public relations and advertising manager for Titanium Metals Corp. of America, New York, sets up a well defined target for his PR shots. "We're not trying to show people scrapbooks filled with stories about the company. We're more interested in promoting the use of the metal," he says. The company's PR efforts are directed at developing new markets by showing why and how titanium is used. One technique: "We try to select the best magazine in a field and give a story on an exclusive basis."

• **Concentrate on Groups**—A top public relations executive with one of the country's largest PR firms tells STEEL that his agency is concentrating its efforts with groups. "Concentrate your fire on groups that are important to you," he says. They could be college students, or educators, or the clergy, or the trade press.

"The technical society platform or seminars at a high technical level may be the best place to tell a new product story in depth," suggests Harold Burson, president, Burson-Marsteller Associates, New York, public relations counselor. The technical seminar is becoming more important as a sales technique, he explains, because it is often the best way for a company to reach the technical or research people in firms which may become customers.

"The (first) basic public relations job (is to) establish the host company as a reputable organization worthy of attention," Mr. Burson advises. Then PR can establish the company as a source of supply. "In industry today, we have plenty of commodity type products made to exacting specifications. The product, the price, and the delivery service may be the same. But the purchasing agent must make a choice. Or purchasing may be done by a committee. That's why it's important for a company to have its identity established with all levels of purchasing influence."

• **Use Direct Approach**—"We don't try to grind out a lot of press releases," says Patrick J. Sullivan, vice president-communications, General Dynamics Corp., New York. "We study our story. We see who may be most interested in it and try to answer their questions. We're rifle shooting rather than shotgun blasting. We try to keep our contacts with all our publics . . . to get their impression of us. We want two-way communications."

• **Can't Live Without It**—"You can't get away from having a public relations department anymore than you can avoid having a legal department," states an Eastern public relations executive. "I don't think there's a company in the country today which is not doing a PR job." He adds that all companies can save

at Marketing Targets

money by formalizing their programs (setting up a PR group).

John F. Apsey, director-public relations, Black & Decker Mfg. Co., Towson, Md., agrees. The PR effort was formalized at his company two years ago. Mr. Apsey changed his advertising cap for a PR hat. "Before, we were mostly interested in talking about our products, but we came to realize how closely we must be identified with the community," he says. The company has concentrated PR efforts on expanding information for shareholders and security analysts and in community relations.

"The chief PR man should be the chief executive of the company," says Mr. Sullivan of General Dynamics. "He sets the policy, and he decides what the organization should be and how he wants it interpreted. I regard my job as purely a staff function."

• **Staff vs. Agency**—Most PR men agree that many jobs can be put into two general categories: Those that are best handled by a company's PR staff and those that are best handled by an agency. Community and employee relations and day-by-day, corporate PR chores should be handled by a company's staff. Financial public relations, special events, and major conferences are often handled best by an agency. The agency offers a broader viewpoint, a staff used to gearing up quickly for peak load situations, and wider acquaintance with the national press and the financial world.

HAROLD BURSON, president, Burson-Marsteller Associates: "Many of our clients are manufacturers of industrial or consumer durable goods. We get into technical products quickly, so we have hired our staff members on the basis of their technical competence as much as for their journalistic background. One-third of our account executives are graduate engineers.

"Industry media (business magazines or trade journals) have become much more important to us. Discussion of a new product or a process improvement in the trade papers has more influence than the appearance of the story in a newspaper. Readers know that business magazine editors have better capabilities to judge the value of an industrial story.

"Business journals have upgraded their editorial product. They show better selectivity and editing. The improvement in business papers has been more dramatic than that shown in the general circulation magazines."

EDWARD GOTTLIEB, president, Edward Gottlieb & Associates Ltd.: "No company will ever find one public relations man . . . who is an expert in all areas . . . for its staff. I recommend an agency because it has particular talents . . . and specialists who can offer objectivity.

"We use our Washington office in a special way. We do not do any lobbying. We do line up the right people for our clients to see. Washington as a locale for a symposium or a press conference is of particular significance."

Philip Klarnet, the firm's executive vice president, adds: 1. Washington is not only the center of government but also the headquarters for many civic, labor, industrial, education, fraternal, and trade associations. 2. The city is a focal point for the dissemination of all news.

EDMUND L. BURYAN, president, Motec Industries Inc.: "Our public relations agency (Gottlieb & Associates) has helped to explain to our publics—the people we do business with—what our corporate objectives are. We use $28 million worth of raw materials annually so our venders are (extremely) important to us.

"Our agency has helped us develop new product contacts.

"They keep us aware of the business climate in Washington. Example: They can keep us informed on what committees of Congress may be interested in. We can know about it sooner. They can also do a research job for us in Washington. I obtained some important background for a speech I prepared recently."

Oil Gets More Attention As Fuel for Blast Furnace

• THE STEEL industry is showing keen interest in the injection of hydrocarbons into blast furnaces as a supplementary fuel. (See STEEL, Dec. 5, 1960, p. 112.)

Some of the key benefits of the technique are cited by Lee A. Kline, chief engineer, Allied Oil Co., Cleveland, a division of Ashland Oil & Refining Co.

"Promise of possible coke savings —up to 25 per cent—and iron production increases up to 14 per cent make oil injection increasingly attractive to U. S. steel producers," says Mr. Kline. "And popularity of the process has grown even more rapidly abroad, where coke costs are considerably higher."

• High oil injection rates—without appreciable increases in blast temperatures — make possible a prompt payout on fuel handling equipment.

"The cost of installing a first-class oil injection system is about $100,000," Mr. Kline adds. "That includes all heating, pumping, and gaging equipment, as well as all safety devices. And the investment can be paid out in four to six months.

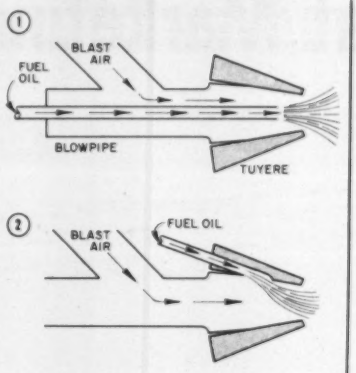
"Each barrel of fuel oil injected into the furnace reduces coke consumption in the stack by about 600 lb. Assuming a cost of $3.50 per barrel of oil, vs. $15 a ton for coke, it isn't hard to justify a saving of $1 on coke for each barrel of oil injected. And injection rates can run as high as 1000 barrels daily, without unreasonable increases in blast temperature. Each percentage point of oil present in blast air requires a temperature boost of about 37 ° F."

• Relatively uncomplicated injection systems are being used in the U. S. and Canada.

Injector designs favored in U. S. plants are said to be simpler than those used abroad. Liquid fuel is heated to about 125° F and piped to the blast furnace area. After additional heating, it is introduced into the air stream at 165 to 200° F, through a lance in the blowpipe or a nozzle in the tuyere. Moving blast air atomizes the oil and carries it into the furnace.

Lances employed in European installations atomize the fuel with compressed air before it reaches the blast air stream.

Two Oil Injector Types Used in North America:



Oil flows through lances in the blowpipes (1) or nozzles in the tuyeres (2), in fuel systems for blast furnaces in the U. S. and Canada

Granite City Stack to Use Fuel Oil

• OIL INJECTION equipment will be put into operation soon on one of the two blast furnaces at Granite City Steel Co., Granite City, Ill.

The supplemental fuel, which will be atomized as it passes through the furnace tuyeres (nozzlelike openings) into the furnace, is expected to reduce the amount of coke used per ton of iron produced. And it may increase hot metal output as much as 10 per cent, by making more stack space available for iron ore.

• The ability to use oil would make standby fuel available when the supply of gas now fueling the operation becomes inadequate.

The company has been injecting natural gas into this stack (its "A" furnace built in 1956) for the last three months, with satisfactory results. But uncertain supplies of the gas (especially during the winter months) make a standby fuel extremely desirable.

"We are getting set up to use No. 6, Bunker 'C' oil, and should have equipment ready for operation in 30 to 60 days," says Lyle F. Gulley, vice president-operations. "It will be some time before we can evaluate results, but if oil injection proves feasible, we will be insured adequate standby fuel."

Cost of the partially completed equipment, which will inject oil at probably all 18 tuyeres of the furnace, has been modest. But company officials declined to comment on the exact amount of capital involved.

• Plans include the injection of solid fuel.

The third phase of the company's fuel injection program will be the trial and possible adoption of pulverized coal as an auxiliary fuel, says Nicholas P. Veeder, chairman and president. The pulverized material would be blown into the tuyeres with air.

Desirability of coal as an auxiliary fuel is based on its relatively low cost.

WHAT TOP EXECUTIVES EARN

(Average total compensation of chief executive officers)

By Company Sales Levels	1960		1959	
	Steel	All Industry Average*	Steel	All Industry Average*
$ 30 million	$ 62,000	$ 62,000	$ 62,000	$ 60,000
$ 60 million	$ 80,000	$ 76,000	$ 81,000	$ 76,000
$100 million	$ 96,000	$ 86,000	$ 98,000	$ 88,000
$200 million	$126,000	$105,000	$130,000	$107,000
$500 million	$180,000	$135,000	$188,000	$142,000

Source: McKinsey & Co. Inc.

*Average for the 25 industries surveyed

Steel Executives Draw Top Pay

How Chief Executives Fared

(Average percentage change from 1959-60)

25 Industries Surveyed	Exec's Pay	Sales	Profits
Air Transport	+9%	+10%	−43%
Aircraft & Missiles	−6	+ 3	+ 3
Automotive	−2	+ 3	−12
Building Materials	−2	− 2	−20
Business Machines	+3	+13	+ 7
Chemicals	+2	+ 4	− 1
Consumer Durables	−2	+ 3	+ 3
Department Stores & General Chains	−2	+ 6	− 6
Electrical Equipment	+2	+ 6	−14
Electronics	+3	+14	+12
Foods	0	+ 3	+15
Food & Drug Chains	−2	+ 5	−14
Industrial Metal Products	−1	+ 4	+ 3
Large Diversified Companies	−1	+ 6	− 8
Machinery (nonelectrical)	−4	+ 5	− 8
Nonferrous Metals	−3	0	+38
Paper	−1	+10	0
Petroleum	+1	+ 5	+10
Public Utilities	+2	+ 7	+ 8
Railroads	+6	− 3	− 5
Rubber	−2	− 1	−27
Soap, Cosmetics, Pharmaceuticals	+2	+ 8	+14
Steel	−3	− 3	−18
Textiles	+6	+ 4	−10
Tobacco	−7	+ 5	− 4

EARNINGS of the average top steel executive dropped 3 per cent last year, but he still ranks among this country's highest paid managers.

McKinsey & Co. Inc., New York management consultant, analyzed the total compensation of chief executive officers in 28 steel companies and came up with these conclusions: As in most industries, pay in steel paralleled the direction of profits and sales. Says Donald J. Richardson of McKinsey: "In 1960, of the 15 executives who received less pay, nine ran companies that had declines in both profits and sales; another three had higher sales but lower profits. Five of the seven executives who received raises headed companies recording increases in sales and profits."

• **How Others Fared**—Comparatively speaking, executives just below the top level in steel (the average No. 2, 3, and 4 men) fared better than the boss. In 1960, the average No. 2 manager was paid 71 per cent as much as the chief executive compared with 64 per cent in 1959. The No. 3 man made 56 per cent of the chief executive's salary vs. 52 per cent in 1959. The No. 4 man earned 49 per cent vs. 44 per cent in 1959.

Among the biggest steel companies last year, there were small dips in the earnings of the No. 2, 3, and 4 men. But in many of the smaller companies, they got raises, a trend also evident in other industries.

In many industries, the No. 2, 3, and 4 men get a larger percentage of the chief executive's salary (the all-industry average in 1960 was 73 per cent, 61 per cent, and 54 per cent), but steel managers take home more in dollars because their bosses generally are paid more.

Wage and Price Controls Near? No!

1 The President does not have the power to institute wage and price controls without Congressional approval.

2 High government officials say controls won't be sought unless there is a shooting war.

3 In a limited war, controls would be used—but only because of inflation psychology, not because of any material or manpower shortages.

RUMORS of impending wage and price controls have disturbed a number of metalworking firms, particularly those hard hit by depressed prices and the profit squeeze. But they are practically scotched by the official word from Washington: A shooting war would have to be just over the horizon for the President to ask Congress for the power to execute plans for controls.

Perhaps the mere existence of plans has disturbed industry, but STEEL has been assured that neither the Council of Economic Advisers nor the Office of Emergency Planning (OEP) is thinking of seeking controls at this time. The plans must be ready to use, however, says Edward F. Phelps Jr., OEP economic stabilization chief, because the basic domestic problem in a limited war would be inflation. He adds that such inflation would be "psychological" (not resulting from shortages nor the necessity to gear up the economy quickly); nevertheless, that sort of inflation would be real.

● **INDUSTRY IS PREPARING**—Industry itself is making preparations for controls. The Employers Association of Detroit has issued a bulletin, "Development of a Salary Rate Structure," with this thought in mind: "With worsening world conditions and current inflationary trends . . . controls could literally be introduced overnight."

Officials in Washington feel that attitude is extreme, but applaud the attention that industry is giving the problem of maintaining a stable economy under wartime conditions.

Mr. Phelps defines two sorts of controls, direct and indirect. Direct controls cover prices, wages, salaries, and rents. Indirect controls include higher taxes, higher interest rates, consumer credit controls, and the encouragement of savings. Mr. Phelps says there will be no need for rationing, particularly consumer rationing, in a limited conflict.

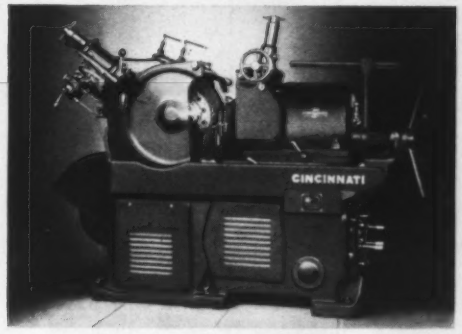
● **NEW MISSILE PROGRAM STARTED**—Defense Department sources say the need for a medium range ballistic missile (MRBM) for use on land and sea is being studied and that development work is about to be started. The MRBM will be "highly mobile." Reportedly, it will be truck mounted for the Army and used aboard small surface ships (destroyer class) by the Navy. It will also be used by North Atlantic Treaty Organization (NATO) forces. Effect of the program on the Army's Pershing program has not been revealed.

Technology developed for the Minuteman may be utilized in the solid fueled MRBM and will probably be a substitute for the rail mounted Minuteman which Secretary of Defense Robert McNamara has trimmed back.

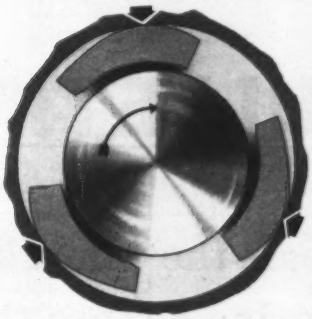
● **RED TRADE RULES TIGHTENED**—Jack Behrman, assistant secretary for international affairs in the Commerce Department, says licensing procedures for exports to the Communist Bloc countries have been tightened in the last few months. Under pressure from investigations by two Congressional committees, Commerce, State, and Defense officials are trying to cut back exports that could be called strategic. Latest license to get Commerce into trouble with Congress was for $1.5 million worth of synthetic rubber to be shipped to the USSR.

● **CIVIL DEFENSE BUILDUP AHEAD**—This year, Congress granted the Pentagon $300 million plus to start the Civil Defense program, including some shelter building. Latest aspects of the program include the possibility of building large shelters in connection with the 41,000 mile interstate highway system. It now appears that the President will come to Congress next year with a more formalized program, including federal aids to manufacturers who want to build shelters at their plants and stock them with survival gear. The details of the program have not been worked out, but some sort of incentive is planned for business (perhaps tax allowances).

Everything about this machine



is obsolete except



its Filmatic Grinding Wheel Spindle Bearings

Filmatic bearings contradict just about everything we know about bearings and progress.

In the 23 years since we started building Filmatic-equipped centerless grinding machines, major advancements have been made in just about every component. But we haven't been able to improve on the Filmatic bearings. Nor has anyone else.

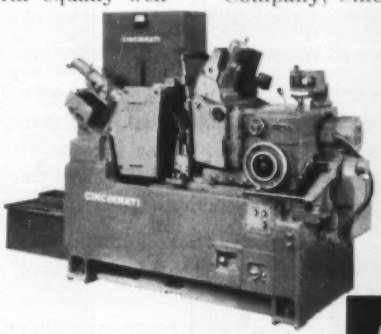
Altogether, Cincinnati has built about 28,000 various types of grinding machines using these bearings. We can identify only 32 cases of failure. This is reliability of 99.9 per cent!

Filmatic bearings never need adjustment once they leave the factory. They perform equally well for rough or finish grinding. There is absolutely no wear.

There are two Filmatic bearing assemblies around the grinding wheel spindle, completely submerged in oil. Each assembly consists of shoes or segments which can rock slightly. Rotation of the spindle draws oil between the segments and spindle, forming a high pressure wedge-shaped oil film between each shoe and the spindle.

These high-pressure oil wedges lock the spindle on the one center of rotation regardless of direction or force of load. This constant center of rotation not only assures precision grinding results, but also makes possible heavier cuts, rapid metal removal, and quick "spark-out" during the grinding operation.

For a graphic presentation of the amazing Filmatic bearing, ask for Publication No. G-604. Grinding Machine Division, The Cincinnati Milling Machine Company, Cincinnati 9, Ohio.



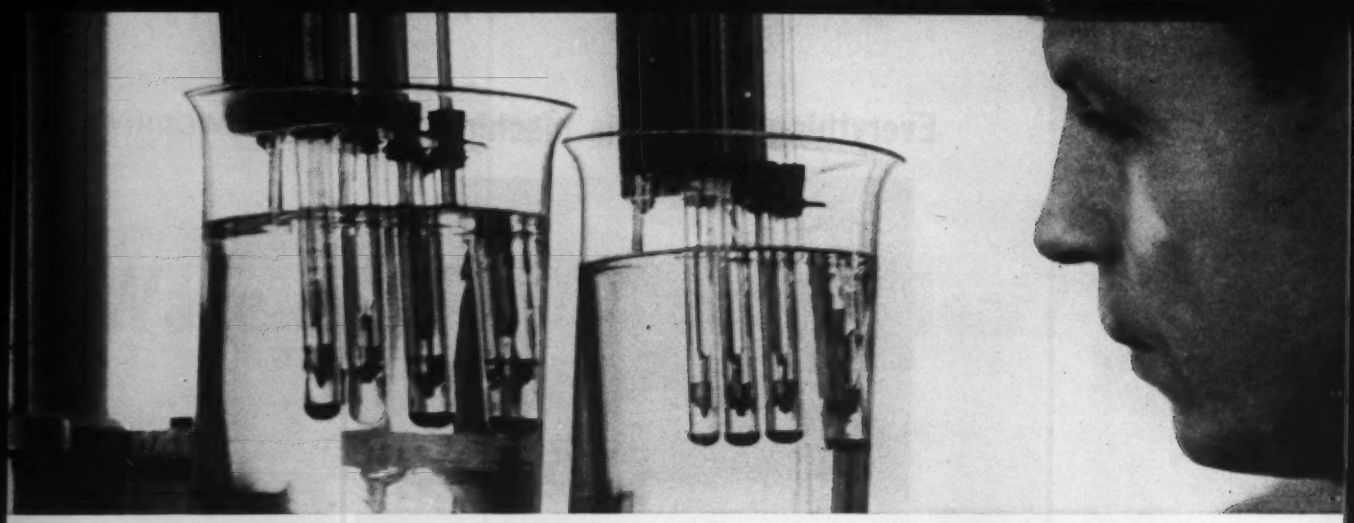
NEW CENTURAMIC MAKES ALL EARLIER CENTERLESS GRINDERS OBSOLETE! More power, weight and rigidity. Automatic grinding wheel balancing. Electro-hydraulic infeed. Obstruction-free working areas. Fast taper adjustment. Many more. These features give you substantial increases in quality, accuracy, dependability —and important reductions in your costs! Ask for Publication No. G-727-2-D.

CINCINNATI PRECISION GRINDING MACHINES:

CENTERTYPE • CENTERLESS • MICRO-CENTRIC • ROLL • CHUCKING • CENTERLESS LAPPING

CINCINNATI®

GRINDING MACHINE DIVISION



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

*Registered Trademark

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are helping to provide better products for industry

The Trader's Horn

by S. J. Rundt

Shift from Quality to Quantity Perils U. S. Trade Overseas

One of the great dangers to the sale of U. S. goods abroad, if not to our future way of life, is the shift from quality to quantity now so apparent. We seem to have huckstered ourselves into a bargain basement attitude. Are we to abandon the values this nation and its people have upheld through most of history? Are we to lose the reputation for solidity, for good merchandise, fair price, fine technology, and service based upon that so typically American and so successful motto "The customer is always right"? As Leonard C. Truesdell, president of Zenith Sales Corp., asks: Are we to move altogether from features to gimmicks? Or as Fred R. Pinter, president of Overseas Export Corp., asked recently: Can we not once more render better service and again produce higher quality?

Another point: It was stressed at the International Cargo Handling Coordinating Association's last meeting that delays affecting up to 40 per cent of U. S. exports were caused by sloppy labels and illegible markings, "among the worst in the world, with their hieroglyphic-like inscriptions."

The Big Squeeze

We seem to be in a vise between insolent labor and imprudent management on many occasions. Trade unions are irresponsibly pressing for pay hikes far beyond actual cost-of-living increases or the current acceleration of manhour productivity, and some of our manufacturers are trying to make up for shrinking profits by reducing the quality of their products.

There have been strikes at our most security vital installations! Some of our missiles at Cape Canaveral fail to go off—in all probability because a 78 cent part was shoddily produced.

On the other hand, the U. S. taxpayer certainly must bear the burden of expense padding by some producers. In the past ten years, this country has spent around $450 billion on its national defense. Did we get 50 cents on the dollar for the huge outlay? Or only 30 cents? Or still less?

Instead of invariably spending more (from the public till or elsewhere), should we not try to spend less, or, at any rate, not to increase our outlays, and endeavor to obtain more and greater value for the dollar we spend? How long can one step up the spending and the attendant deficiteering?

Another Weak Spot

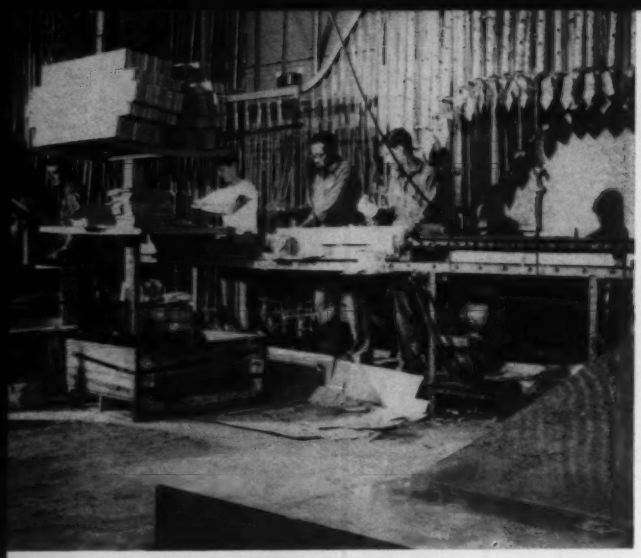
Poor quality exports are beginning to hurt our good name abroad. And better quality of foreign products is responsible for many importations to our shores that we hitherto could turn out in unexcelled quality. (Japan has changed from quantity to quality in many fields, since World War II. Germany, perhaps the "most Americanized" part of Europe in an American century, is frequently no longer producing the top quality it used to. Japanese cameras are, therefore, marketed in Germany!)

Switzerland: More Holdings

The establishment of holdings in Switzerland by U. S. firms continues without letup. Whatever Congress may decide next year about Treasury pressure, more and more companies here feel that, with the European Common Market gaining in strength and in scope, it will be a "must," for them to sit firmly in the center of the continent. Financially, in terms of accessibility, with regard to clearings and trade facilities involving markets which are not easily "reached" from here, Switzerland offers many opportunities. It should be noted, however, that the setting up of a subsidiary, trading post, or holding in the Confederation is a matter of careful preparation, negotiation, and personnel selection. Quite a few U. S. corporations in Switzerland appear to have poorly chosen locations and unfortunately picked steadholders. The Swiss, meanwhile, pro-American by habit and given to like so many things American, are becoming more leery and even inhospitable over the unending onslaught of migrants across the Atlantic to their stable domain. Both marketing men and credit managers are breathing easier and should, where profit margins allow, take a somewhat more lenient attitude toward terms of payment with first class venezolano customers.

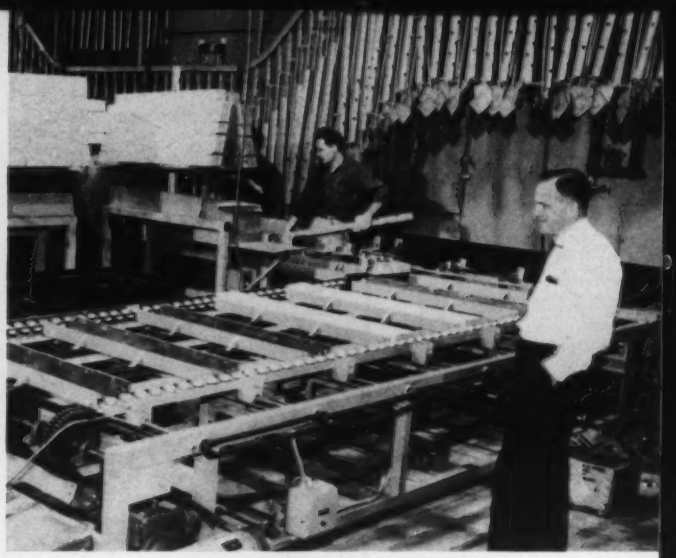
Venezuela: Collections Better

After many months of gross delinquency in collections from Venezuela, a marked improvement is being registered, both for old backlogged and current items.



Man with a packaging problem . . .

In seeking ways to speed the packing of jack posts, Howard F. Guerin, (in white shirt, right), vice president, Roth Steel Co., Cleveland, found he could trim carton costs 25 per cent, increase package output 10 per cent, and lower labor requirements 17 per cent. The solution: Packaging Corp.



Acquires a cost cutting carton sealer

of America, Evanston, Ill., suggested and built a special carton sealer that will pay for itself in 12 months. "Whenever business calls for a production step up, handling costs could be cut further by adding an automatic palletizer to the packaging line," observes Mr. Guerin.

Got a packaging problem? Check how . . .

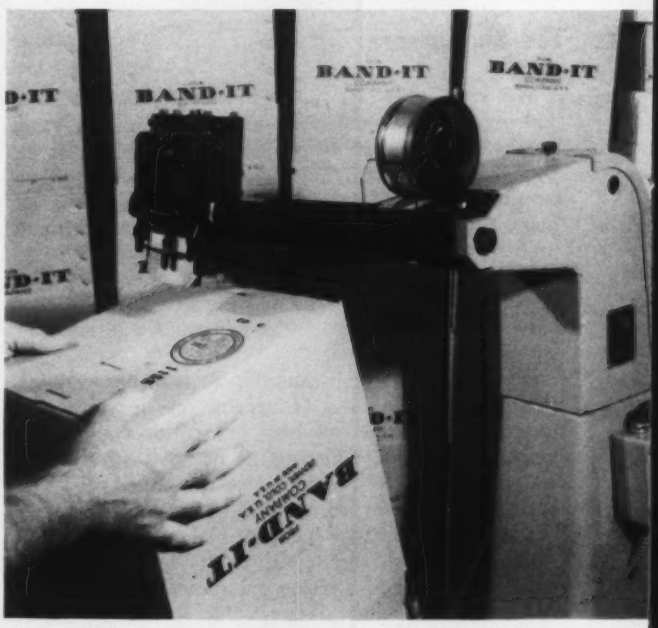
Package Machinery Makers Help Chop Costs

WHETHER you ship your products in plastic pouches or use strapping on sheet steel, packaging equipment makers are working to help you produce better packages at lower cost. Emphasis is on higher speeds, machine versatility, ease of maintenance, and efficiency.

• **Market Size**—Trade sources estimate the packaging machinery industry annually rings up $300 million to $400 million in sales. Exhibitors at the Packaging Machinery Manufacturers Institute Show in Detroit last week predicted their sales volume this year would be 20 per cent greater than 1960's. They said that during this year's first half, sales of machinery and related materials ran about 16 per cent ahead of the average recorded in 1960.

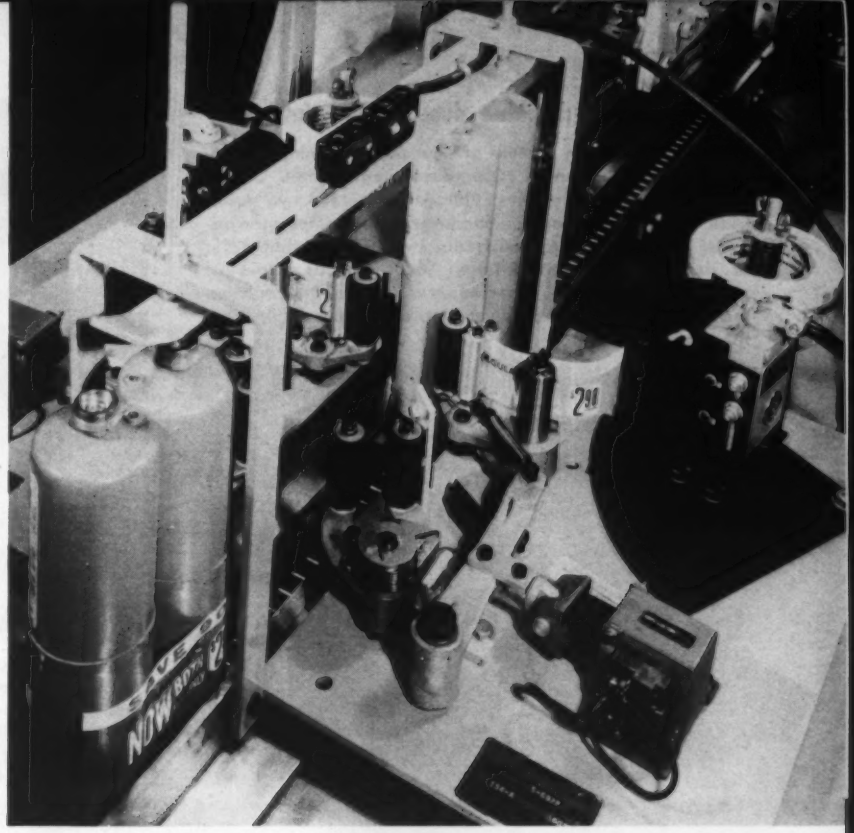
• **Growth Field**—Exhibitors voted the food industry as the one most likely to step up buying of packaging machinery and materials during 1962 and 1963.

• **Pictorial Tour**—Here are a few of the hundreds of developments and methods packaging equipment companies and suppliers are introducing this year.



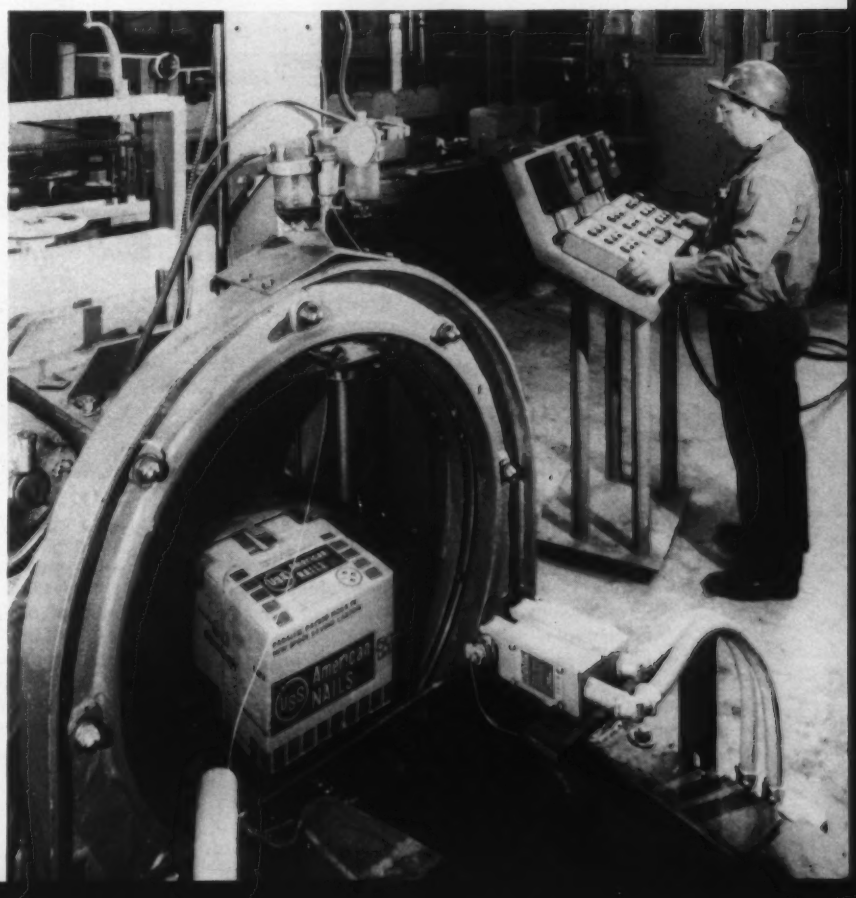
Taping proves 95% faster

A combination bundler, applying printed paper tape, hikes packaging speed of Otto Bernz Co.'s (Rochester, N. Y.) propane gas cylinders 95 per cent, cuts costs about 10 times, and requires only one operator vs. four formerly. Before installing Minnesota Mining & Mfg. Co.'s taping machine, the torchmaker inserted cylinders in sleeve type cartons which had to be padded, and they weren't rigid enough. "Once taped, it was difficult to even pull them apart," says the company. That helps assure the special combination will remain intact to the point of purchase.



No-hands strapper works automatically

A new nail packaging line at U. S. Steel Corp's American Steel & Wire Div. plant in Joliet, Ill., features a fully automatic, round steel strapping machine. (Designated Model 1200, it's a product of the U. S. Steel Supply Div.) The development uses electromagnetism to load nails in neatly aligned rows rather than jumbled masses. Another version of the strapping unit can scan various carton sizes and adjust itself to apply the proper number of straps—tensioning, tying, and cutting them automatically. Product range: Foods to newspapers.

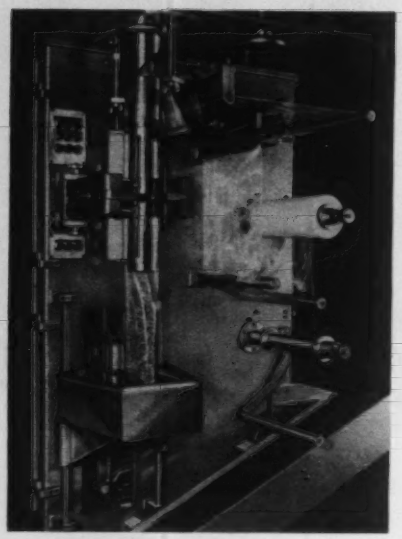


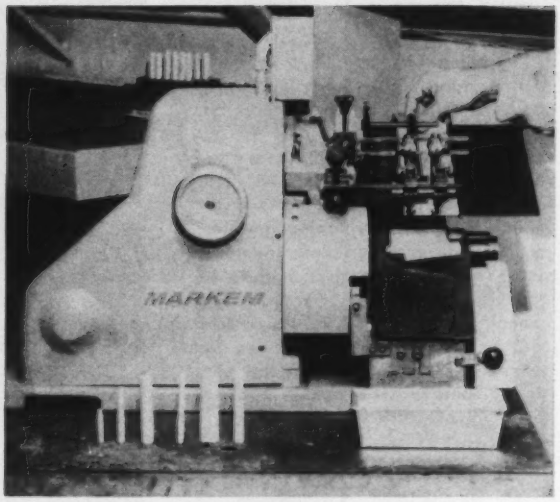
Stapler reduces material costs 25%

By adopting Bostitch's Golden Belt stapling machine to bottom cartons for shipping industrial pressure clamps, Band-It Co., Denver, gets more secure cartons and cuts material costs 25 per cent. The stapler replaces two, narrow crown staplers and closes the bottoms of export cartons with eight staples instead of 12 or 16. Domestic cartons now call for four staples vs. eight formerly. The new machine takes less operating time, produces more cartons, and eliminates 75 per cent of reloading time. The wide crown staples (4000 in a coil) are automatically fed to the operating head when a foot control is pressed.

Pouching machine does double duty

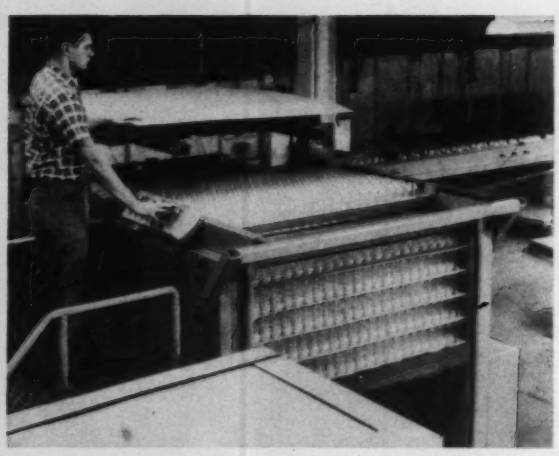
Versatility is the key feature of new pouch forming, filling, and sealing Stokeswrap 1000, developed by FMC Corp.'s Packaging Machinery Div., Philadelphia. Its two tubes (side view shown) have independent drives. Operator options: He can simultaneously run two products that differ in size or kind, with different feeds, speeds, types of pouches, and sealing methods. The open construction makes changeovers and adjustments quick and simple, says the manufacturer.





Marker cuts costs 50%

Product identification of cutting tools proved a headache for Jarvis Corp., Lynn, Mass. The company packages about 1300 variations of tools in six different sizes of paper tubes. Identification on the tubes changes about every 12 to 15 pieces. Preprinted labels were used but they came off the cylinders too often and sometimes required hand stamping with additional information. Markem Machine Co., Keene, N. H., recommended its Model 20AG offset marking machine for printing directly on the tubes. Results: Doubled tube use, faster, more permanent identification, and a 50 per cent packaging saving through elimination of labels.



Bulk palletizing saves time, space

An automated equipment system for racking and stacking 7000 bottles on a single pallet has been developed by American-Wheaton Glass Corp., a subsidiary of American Can Co. Advantages: Up to 53 per cent better utilization of warehouse space; up to 120 times faster unloading of vans—vs. the rate for unpalletized cases; less handling than with 24 bottle case units; lower inventory requirements; better purchasing methods; and greater marketing flexibility. It also facilitates production operations.

Pipe bundler hikes output 20%

A cut in manhours and a 20 per cent boost in the packaging production rate were effected by installing a pipe bundler at an Eastern plant. The F4 strapping machines, made by Acme Steel Co., Chicago, can be fully automated. In this case, a pushbutton cycles the pneumatic units. Straps are applied simultaneously by the machines, which are mounted on wheeled carriages for quick repositioning to handle varying lengths of pipe. The machine works with various fixtures that locate, rotate, or collect items for strapping.

First in our laboratories, NOW FROM THE FIELD excellent performance reports on this new Vanadium-Alloys high speed steel...

Vasco HYPERCUT, tested widely throughout the country under designation B-1426, is now available for the general market. Because this remarkable new steel hardens to 70 Rockwell C, you'll find it easy to harden regularly to performance peaks of 68-69. Vasco HYPERCUT is recommended for machining superalloys and heat-treated steels. Available in tool bits, bars, forgings, drill rod, sheet, plate and circles. Details on request.

VASCO Hypercut®

Metal Producer

Type of test—BREAKDOWN TEST TURNING INCONEL 700

Grade	*Length of Cut*	*Tool Life*
VASCO HYPERCUT	18"	90 minutes
	Second Test	
VASCO HYPERCUT	23"	115 minutes
A competitive high hardness high speed steel	15½"	77½ minutes

Large Forging Company

Type of test—LATHE TURNING ON INCONEL 901, V-57 and titanium metals

VASCO HYPERCUT operated a full lathe hour shift on two resharpenings as against four regrinds with super high speed steel.

Tool Manufacturer

Type of test—END MILLS ON A SPECIAL CUTTING TEST SETUP

VASCO HYPERCUT performed 80% better than Brand A high hardness high speed steel, 50% better than Brand B high hardness high speed steel and 200% better than M-34 high speed steel.

Toolmaker

Type of test—CUTTING SLOTS IN SHAFTS HEAT-TREATED TO ROCKWELL "C" 36/44

VASCO HYPERCUT doubled the production of carbide tools and triples the production of M-4 tools.

Midwest Aircraft Manufacturer

Grade	SPEED (SFM)	TOOL LIFE (MIN.)	METAL REMOVAL (cu.in.)	COST per Cubic Inch
VASCO HYPERCUT	22	60.0	13½	$0.62
Brand S-1	22	27.0	6½	.88
Brand R-1	22	5.1	1	2.31
VASCO HYPERCUT	35	13.0	4-8/10	0.77
Brand S-2	35	3.7	1½	2.06
Brand R-2	35	.94	½	4.81
VASCO HYPERCUT	35-24	38	3½	0.75
Brand S-3	35-24	1.84	1¾	1.64
Brand R-3	35-24	1.25	1½	2.01

VANADIUM-ALLOYS STEEL COMPANY

GENERAL OFFICES: LATROBE, PA.

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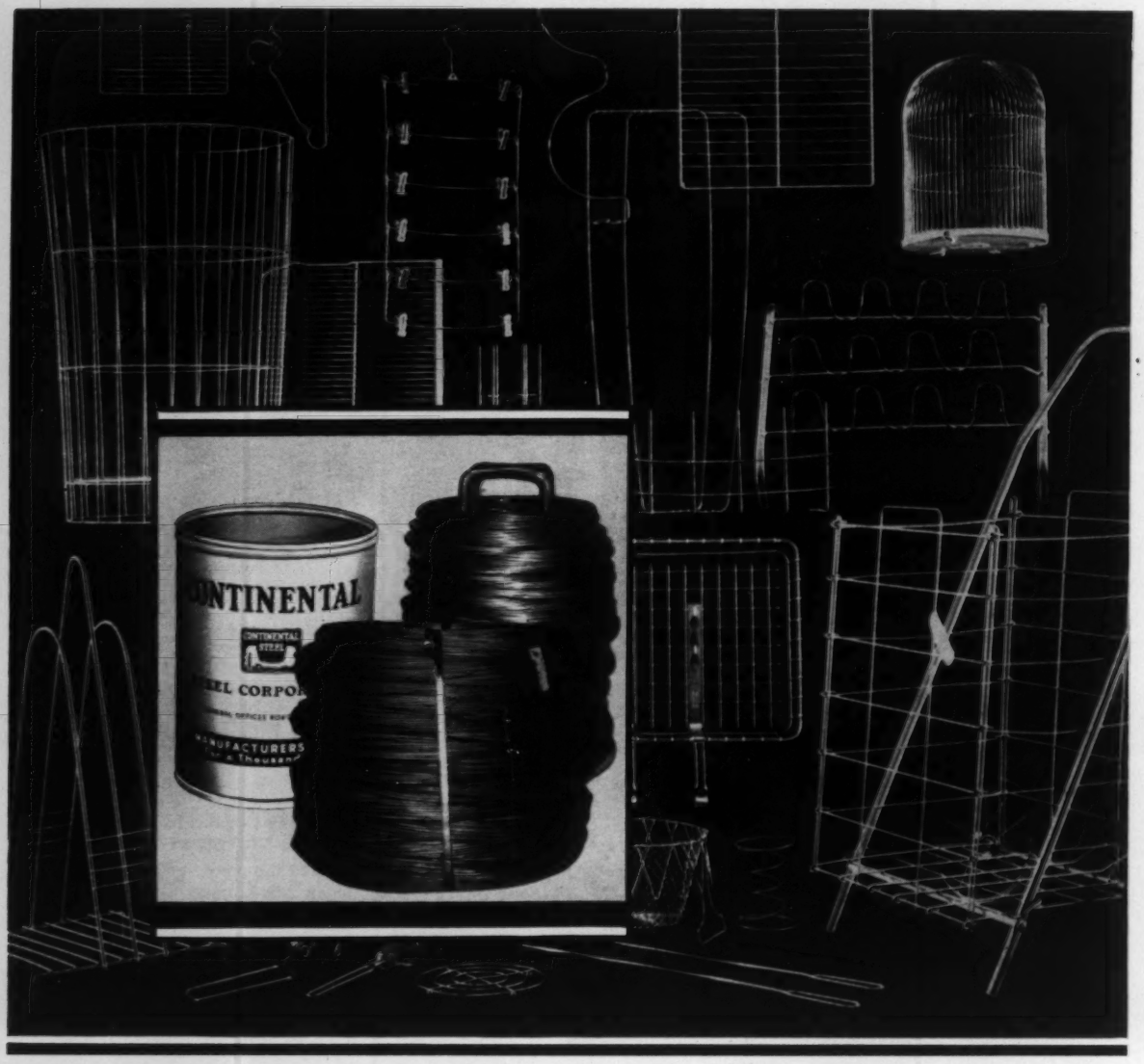
SUBSIDIARIES: Vanadium-Alloys Steel Canada Limited • Vanadium-Alloys Steel Société Italiana Per Azioni • EUROPEAN ASSOCIATES: Société Commentryenne Des Aciers Fins Vanadium-Alloys (France) • Nazionale Cogne Società Italiana (Italy)



how Continental® wire improves quality and cuts costs

Formability that permits difficult twists and bends . . . sustained fast production in coil after coil . . . smooth tight coatings that do not powder, flake or peel to jam machines. Such wire calls for consistent, uniform quality. You get it at Continental, in practically any size, finish, temper or analysis, in low, medium low, medium high and high carbon steels. Special shapes, too. In packaging, Continental was one of the first with long run, continuous length catchweight coils—Econo-Coil® with reel, Econo-Pak reel-less—1500# to 2500# depending on finish and gage. Or Leverpak, the modern drum container for 12 gage through 24 gage that keeps wire clean and dry. Why not let our mill technicians help you improve your quality and cut costs. We may have the answer to a particular need. Write today for your free copy of our new wire manual.

Steel

SPECIALISTS IN WIRE FOR OVER HALF A CENTURY

CONTINENTAL STEEL

CORPORATION • KOKOMO • INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE®, BRYTITE®, FLAME SEALED®, Coppered, Tinned, Annealed, Liquor-Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric. Nails, Continental Chain Link Fence and other products.

Target to the North: 18,000 sales in '62 as...

Rambler Moves into Canadian Market

Canada's Model Year Production

(Thousands of units)

	1961	1960
GM	153.9	156.5
FMC	89.1	93.5
Chrysler	46.6	42.4
S-P	5.3	6.4
AMC	4.2	0.0
Totals	299.1	298.8

Source: *Ward's Automotive Reports.*

WHEN AMERICAN Motors Corp. closed down its Canadian operations in 1957, Canada's auto industry was in a decline. Unrealistic import duties, high excise taxes, and higher production costs associated with low volume had put the squeeze on the five automakers that operate as subsidiaries of U. S. firms. The average price differential between popular priced imports and Canadian built cars leaped from $500 to $1174. Result: Car production dropped as import sales rose from 6 to 28 per cent of last year's 448,000 car deliveries. A sixth of the 49,000 industry workers were unemployed.

Now the bulge of domestically built compacts (20 per cent of production), elimination of the 7.5 per cent excise tax, and pending changes in tariff regulations is reviving Canada's auto industry. Production (325,000 cars) in 1960 was 8 per cent higher than in 1959. This year's output is expected to reach 340,000 units. Import cars have slipped back to 22 per cent of sales and Earl K. Brownridge, general manager, American Motors (Canada) Ltd., predicts they'll slump to 15 per cent. The price differential is back down to $500.

• **Result**—Rambler has returned to Canada with the aim of duplicating the performance of its parent company. It's currently accounting for 2 per cent of sales, but Mr. Brownridge ultimately wants 15 per cent of the market. He's forecasting a 50 per cent sales hike over 1961's 12,000 deliveries. About 10 per cent will be imported from the U. S. About 270 of the dominion's 4000 dealers now handle Ramblers.

Assembly of the Classic models started last January in American Motors' newly built $3.5 million plant in Brampton, Ont., a suburb of Toronto. The 250,000 sq ft plant started turning out 36 cars daily. Production climbed to 56 a day in midyear and last month jumped to 70 units. All but top Ambassador models and the American convertible are built there. Price cuts ranging from $57 to $283 went into effect on 1962 model cars. AMC's price cuts in the U. S. range from $50 to $230. The lowest priced American de luxe sedan is delivered for $2295 by dealers in the Toronto area. The same car imported from Kenosha, Wis., would be delivered for about $2750, including the 17.5 per cent import duty.

Several factors are helping the Canadian plant show a profit in its first year of operation. Like its competitors, it's relying on plastic and Kirksite dies and other short run tooling which can handle the lower output at less cost. Labor

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ZINC plating powder, vari-sized glass balls, and parts go into . . .

New Mechanical Plating Line Introduced by Supplier

ROBIN PRODUCTS CO., a Detroit fastener maker, will demonstrate its mechanical plating process this week to selected engineers from automotive and supplier companies. The line has been in operation three months. Preliminary studies indicate savings on high carbon parts may exceed 10 per cent, says John Stoutenburg, Robin's executive vice president. The line handles a wide variety of parts. Example: Robin makes and plates about 250 different types of fasteners for automotive and appliance use.

Mechanical plating is a development of Minnesota Mining & Mfg. Co. Parts are barrel tumbled 30 to 45 minutes in a water base aggregate, consisting of zinc plating powder, varishaped glass balls, and a 3M chemical which promotes transfer of the zinc to part surfaces. Typical coating thickness is 0.00025 to 0.0005 in.

• **Advantages**—The chief assets of mechanical plating are said to be: 1. It does not create hydrogen embrittlement. 2. The equipment costs half as much as comparable electroplating systems. 3. Plate thickness is regulated by the amount of powder used, so there's no need to increase plating time. 4. The system can handle fairly complex parts without special racking or handling fixtures.

Mr. Stoutenburg points out that finishes are neither as smooth nor as bright as those you get with electroplating, but he says those factors aren't important because the fasteners are painted, or they are covered by various types of trim strips.

After 600 hour salt bath tests, the mechanically plated parts still meet all fastener corrosion specifications for autos.

• **Process**—Parts are stamped from low and high carbon steel. They're dumped into stainless steel perforated barrels and run through degreasing and scale removal baths. They're then given a light copper strike and rinsed before being transferred to the horizontal plating barrel which rotates at 12 rpm.

After plating, the parts and media are run through a vibrating separator. Finished parts continue on to drying or to dichromating operations if no other finishes will be applied.

---

rates are lower than in the U. S. A typical hourly worker in the Brampton plant gets $2.04 in straight time pay. His counterpart in Kenosha averages $2.62 an hour. The Canadian firm's labor contract doesn't expire until next June.

Mr. Brownridge claims his plant is beating the manhour per unit rate of AMC's Kenosha production lines. With 580 employees and a single, 10 hour daily shift, that works out to 82.8 manhours per car. No comparable figures are available for the U. S. operation, although the ratio of total employment to production is about 8.5 workers per car in Canada against 15 per car in the U. S.

Those figures are somewhat misleading, however, since Canada still imports 44 per cent of the components for its cars from U. S. plants. Mr. Brownridge hopes to lower that to 40 per cent by the end of the year.

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	599,474	613,136
July	399,191	434,377
August	195,266	305,514
September	354,711	407,691
October	557,200	617,972
10 Mo. Totals	4,283,085	5,575,048
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108
Week Ended	**1961**	**1960**
Oct. 7	102,098	140,832
Oct. 14	96,207	144,056
Oct. 21	143,150	146,339
Oct. 28	159,136	150,019
Nov. 4	152,554†	145,537
Nov. 11	155,000*	138,682

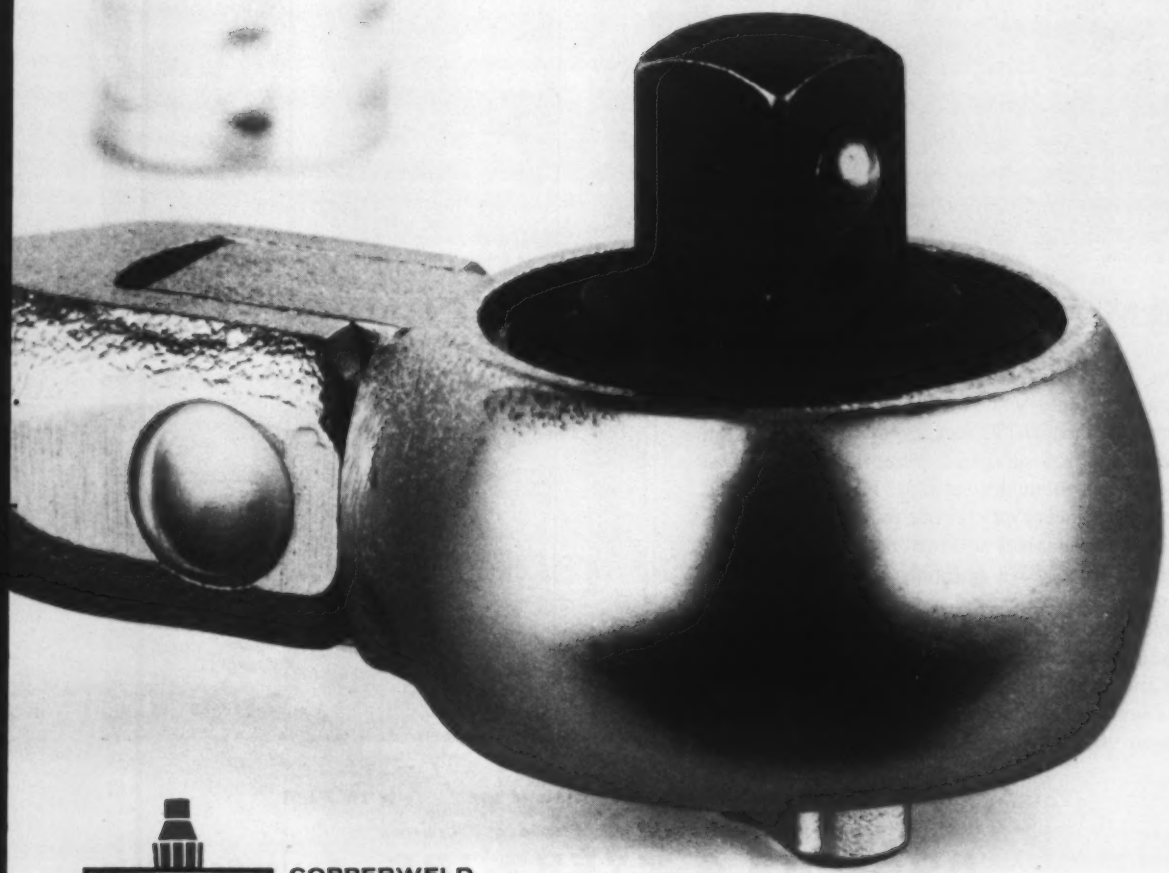
Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

250,000 full turns, more than a lifetime of service, and the amount of wear on ratchet drive lugs, or tangs, is practically unnoticeable. Corners remained sharp and clean and the surface unmarred.

What kind of steel does New Britain specify for these vital parts? What kind of steel offers this combination of high torque strength, high surface resistance to wear and Brinelling, plus uniform machinability? An alloy steel, of course . . . Aristoloy 4150 to be specific.

Write today for complete information about Aristoloy alloy steels in leaded and unleaded grades. Ask for Product and Facilities Catalog or call your nearest Copperweld representative.

Wear-Proof Tangs... Alloy Steel of course



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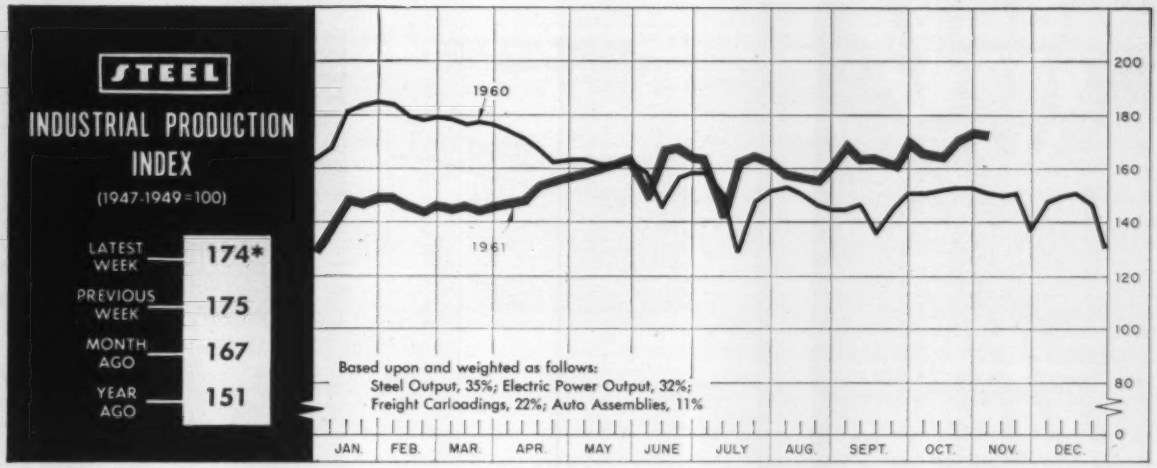


*Week ended Nov. 4.

Automakers to Pace Renewed Upturn

IF THE STRIKES in the automotive industry were responsible for the apparent slowdown in the economy in September and October—as many analysts contend—then look for a speedup in the November-December pace. Production will be second best to only that of the corresponding period in 1955.

And if October's new car sales are any indication of new model acceptance, you can look for high level production well into 1962.

● **Figures Look Good**—Despite a loss of 100,600 units from October's schedules, the industry is expected to turn out 1,800,800 assemblies during the current quarter, says *Ward's Automotive Reports*. By comparison, last year's fourth quarter output (second best in history) was 1,739,032 units; the record in 1955's final quarter was 1,949,131. If the schedule is adhered to, output for 1961 will be 5.5 million cars.

Equally encouraging was the dealer sales of 535,000 units in October, making it the second best count for that month, trailing only October, 1960. Starting at low ebb in the first ten day selling period (when strikes kept the selection at a minimum), sales built up to a record in the last third of the month.

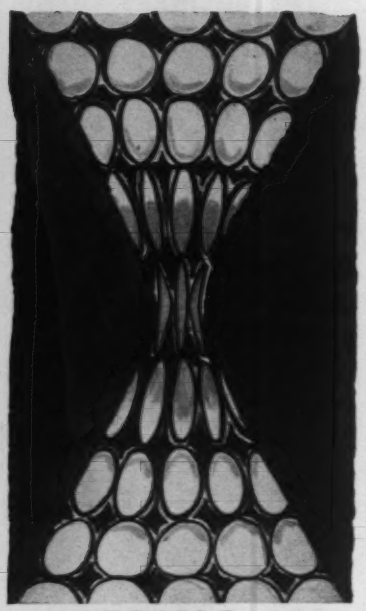
Ward's estimates that about 12 per cent of the fourth quarter production will be for inventory, putting the count at about 875,000 units by yearend. Production schedules in the first quarter of next year will include at least 100,000 units for inventory unless: 1. Sales flop once the new model impetus has worn off. 2. Dealers decide to keep stocks below the year-ago level of about 1 million units.

● **Figures Can Deceive**—But it is still too early to get a good fix on the new car market. The strong upturn in October may reflect no more than delayed sales from September. By January or February, it should become clear whether 1962 will be a whopper or a flopper for the auto industry. Most estimates

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,044[1]	2,044	1,468
Electric Power Distributed (million kw-hr)	15,350[1]	15,263	14,373
Bituminous Coal Output (1000 tons)	8,980[1]	8,545	8,154
Crude Oil Production (daily avg—1000 bbl)	7,135[1]	7,128	6,940
Construction Volume (*ENR*—millions)	$527.0	$417.1	$373.4
Auto, Truck Output—U. S., Canada (*Ward's*)	187,897[1]	193,627	170,946
TRADE			
Freight Carloadings (1000 cars)	645[1]	648	599
Intercity Truck Tonnage (changes from year ago)	+7.0%	+6.7%	−4.1%
Business Failures (Dun & Bradstreet)	304	398	331
Currency in Circulation (millions)[2]	$32,801	$32,849	$32,104
Dept. Store Sales (changes from year ago)[2]	+2%	+4%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$29,655	$27,792	$29,413
Federal Gross Debt (billions)	$296.8	$296.2	$291.4
Bond Volume, NYSE (millions)	$30.2	$28.9	$25.1
Stocks Sales, NYSE (thousands of shares)	17,949	16,991	13,462
Loans & Investments (billions, adjusted)[3]	$117.0	$117.8	$107.4
U. S. Govt. Obligations Held (billions)[3]	$34.3	$34.6	$29.6
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	224.8	225.4	222.5
All Commodities[6]	118.6[1]	118.6	119.0
Commodities Other than Farm & Foods[6]	127.2[1]	127.2	127.5

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.



BRMCO 3004 STRIP ALUMINUM MATCHES 5052...

SAVES COMPANIES $40.00 A TON

A top electrical equipment manufacturer, wanting to reduce production costs, asked BRMCO and several other leading mills to develop a 3004 strip aluminum to replace the 5052 they were using. Because of a critical forming operation, they required a tensile strength within 37,000-42,000 psi, with a 5% minimum elongation.

BRMCO field engineers, metallurgists and production men attacked this difficult problem, realigned strip production methods and quickly produced a 3004 strip with the required tensile strength and with an elongation factor well above the minimum requirement.

BRMCO now can save all manufacturers $40.00 a ton in strip aluminum costs by supplying them these 5052 characteristics in a lower cost alloy.

This same technical assistance can cut your nonferrous strip costs, increase your production. Write or call today, without obligation. If you phone, call EDison 7-4434 (Bridgeport—collect) and ask for Larry Hayden, field service department.

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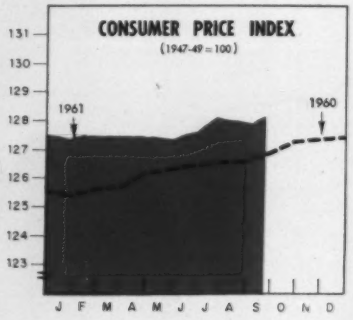
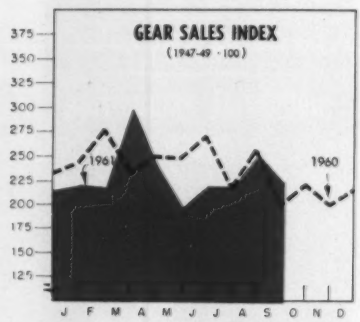
THE BUSINESS TREND



	1961	1960	1959
Jan.	127.4	125.4	123.8
Feb.	127.5	125.6	123.7
Mar.	127.5	125.7	123.7
Apr.	127.5	126.2	123.9
May	127.4	126.3	124.0
June	127.6	126.5	124.5
July	128.1	126.6	124.9
Aug.	128.0	126.6	124.8
Sept.	128.3	126.9	125.2
Oct.	....	127.3	125.5
Nov.	....	127.4	125.6
Dec.	....	127.5	125.5

U. S. Bureau of Labor Statistics.
Charts copyright, 1961, STEEL.



	Bookings 1961	Bookings 1960	Shipments 1961	Shipments 1960
Jan.	220.8	243.4	227.3	207.3
Feb.	218.3	278.6	214.4	230.2
Mar.	299.3	231.8	246.8	244.6
Apr.	241.9	249.2	233.9	234.8
May	198.0	246.9	239.1	241.3
June	220.0	269.8	245.4	253.6
July	219.8	217.5	200.1	210.8
Aug.	252.5	255.8	240.4	217.3
Sept.	223.3	197.9	225.4	223.5
Oct.	....	219.9	....	220.6
Nov.	....	198.9	....	226.7
Dec.	....	216.5	....	220.0
Avg	....	235.5	....	227.6

American Gear Mfrs. Assn.

for production next year still range close to 6.8 million units. Officials of GM's Chevrolet Div., riding high on record October sales, are sticking to their forecast of 7,250,000 industry sales (including 400,000 imports). They add that a vigorous economic recovery next year could push the total to 7.5 million.

● **Trucks Add Glamour**—The situation in the truck portion of the industry is equally good. The anticipated 300,000 unit yield this quarter would be the highest for the period since 1955. That pace is expected to carry over into next year. If both truck and auto production hit the upper range of the current forecasts, the total could set a new standard for the industry.

● **Steelmakers Lag** — Steelmaking still has not shown the effects of the renewed strength in auto production for two main reasons:

1. Automakers were well stocked with steel when their labor contracts were signed. They had continued to accept delivery during the strikes.

2. Seasonal factors are cutting back demand from at least two large users—the canmaking and construction industries.

But look for at least a small upturn soon. It is reported that automakers will start to buy in excess of requirements yet this quarter in a gradual buildup prior to the steel industry's labor contract deadline on June 30.

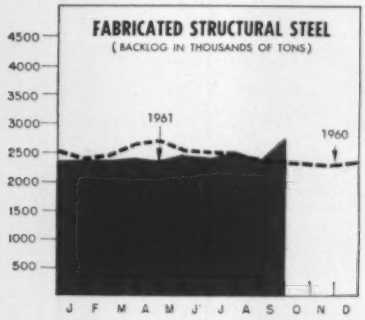
Sees '62 Building Record

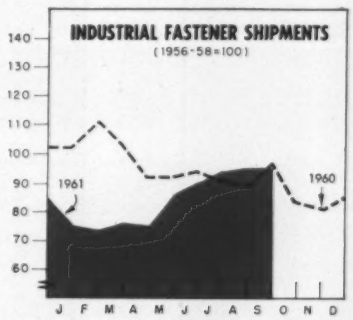
The outlook for the construction industry is one of the brightest spots in the economic picture. It is expected to set its seventeenth consecutive dollar volume record (annual) in 1962, declares F. W. Dodge Corp.

Construction awards this year are expected to total nearly $37.3 billion compared with last year's record $36.3 billion. A fast start on work put in place next year is assured, and the pace is not expected to slacken for some time. Dodge officials see another 7 per cent gain in 1962 (see table, Page 133).

Physical volume is also expected to rise next year, with gains in every category except hospitals and institutions (down 2 per cent) and miscellaneous nonresidential (even with 1961's). Manufacturing floor space is expected to show the biggest gain (10 per cent).

Dodge economists look for nonfarm housing starts to reach 1.4 mil-





	Shipments 1961	Shipments 1960	Backlogs 1961	Backlogs 1960
Jan.	261.6	235.1	2,371.2	2,390.5
Feb.	260.2	270.9	2,357.4	2,473.8
Mar.	292.4	311.6	2,392.1	2,671.8
Apr.	318.7	322.7	2,377.5	2,713.4
May	365.0	320.1	2,457.8	2,528.2
June	361.2	374.2	2,414.7	2,507.5
July	286.9	338.9	2,517.1	2,489.8
Aug.	359.5	373.4	2,377.5	2,389.1
Sept.	326.2	363.9	2,729.3	2,325.6
Oct.	....	352.8	.....	2,291.4
Nov.	....	324.7	.....	2,278.2
Dec.	....	276.9	.....	2,332.8
Total	....	3,865.2		

American Institute of Steel Construction.

(Seasonally adjusted)

	1961	1960	1959	1958*
Jan.	75	102	99	133
Feb.	74	111	105	117
Mar.	76	103	105	103
Apr.	75	92	119	102
May	86	92	119	111
June	90	94	129	120
July	94	91	112	133
Aug.	95	89	77	120
Sept.	95	97	92	141
Oct.	...	83	83	137
Nov.	...	81	80	134
Dec.	...	85	102	152
Avg	...	94	101	125

*1947-49 = 100.
Industrial Fasteners Institute.

lion, up 8 per cent from this year's estimated 1.3 million units.

Buyers Note Leveling Off

Purchasing agents continue to report that business is getting better, but the October business survey of the National Association of Purchasing Agents (NAPA) reflected the slowdown that occurred in early fall. While 51 per cent of the respondents said that new orders were better, the total was down from the 58 per cent so reporting in September. Moreover, the number reporting lower orders rose to 13 per cent from September's 6 per cent. The number reporting production as better stayed the same as in September, but those reporting lower output rose by 4 points to 14 per cent.

More Records for Construction Contracts

(48 states; 000 omitted)

	1961 Estimate*	1962 Estimate	Change
Nonresidential	$12,256	$12,712	+ 4%
Residential	15,867	17,532	+10%
TOTAL BUILDING	28,123	30,244	+ 8%
Public Works & Utilities	9,155	9,717	+ 6%
TOTAL CONSTRUCTION	37,278	39,961	+ 7%
Private Ownership	24,603	26,574	+ 8%
Public Ownership	12,675	13,387	+ 6%

*Eight months actual, last four months estimated.
Source: F. W. Dodge Corp.

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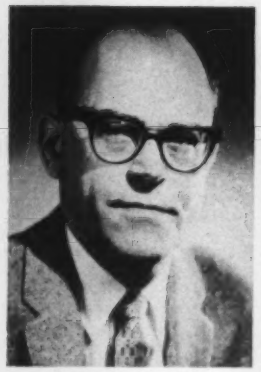
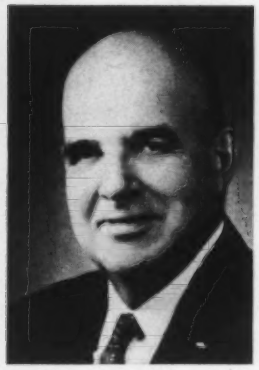


G. P. LAVOLD
Foote Bros. gear sales



G. L. COBLEIGH
Norton Pike sales mgr.

DELBERT G. FAUST
Norgren eng. v. p.

JOHN D. NOSLER
Wilkerson mfg. mgr.

G. P. Lavold was made gear products sales manager, **Foote Bros. Gear & Machine Corp.**, Chicago. He was in charge of gear and reducer application engineering, and continues those duties.

William F. Martin was elected president, **Tube Reducing Corp.**, Wallington, N. J. Before joining Tube Reducing in August, he was vice president and assistant general manager, Mechanics Universal Joint Div., Borg-Warner Corp.

Stanley A. Frankel was appointed vice president and director for corporate development of **Luria Bros. & Co. Inc.**, New York, division of Ogden Corp.

Frederick C. Smith was elected president, **Huffman Mfg. Co.**, Dayton, Ohio, to succeed **Horace M. Huffman Jr.**, now chairman. **L. L. Warriner**, former chairman, becomes chairman of the executive committee.

G. L. Cobleigh was appointed sales manager of **Norton Pike Div.**, Littleton, N. H., Norton Co.

Delbert G. Faust was named vice president-engineering, **C. A. Norgren Co.**, Englewood, Colo. He was vice president-marketing, and had formerly served as chief engineer.

Herbert B. Evans was named vice president-manufacturing and engineering, **Harvick Mfg. Corp.**, South Gate, Calif., subsidiary of Tenney Engineering Inc. He was in charge of welding and fabrication operations at Associated Piping & Engineering Co.

Martin F. Rummel was promoted to director of purchasing and production control at **Pontiac Motor Div.**, Pontiac, Mich., General Motors Corp.

Ross R. Holmes was made general sales manager, **Hoeganaes Sponge Iron Corp.**, Riverton, N. J. He was chief metallurgist.

John D. Nosler was named manager of manufacturing at **Wilkerson Corp.**, Englewood, Colo. He was senior manufacturing engineer at Martin Co.

Bruce W. Klein, former chief engineer - automotive products, was named director of engineering, **Marshall-Eclipse Div.**, Troy, N. Y., Bendix Corp. He is succeeded by **F. William Aldrich.**

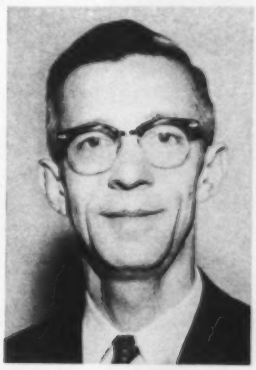
Martin M. Frank was elected vice president of **Standard Beryllium Corp.**, New York.

James F. Burkett was elected president, **Machine Special Machine Co.**, Warren, Mich., to succeed **Jerome Sullivan**, now chairman. **Fred C. Berger** was elected vice president.

Harold R. Montgomery was made manager of electric furnace plants for **Norton Co.'s** Abrasive Div. He has headquarters at Chippawa, Ont. Other plants under his management are at Cap de la Mad-

STANLEY A. FRANKEL
Luria vice president

FREDERICK C. SMITH
Huffman Mfg. president



ROSS R. HOLMES
Hoeganaes gen. sales mgr.

HAROLD R. MONTGOMERY
Norton-Abrasive Div. post

Dr. GEORGE A. ROBERTS

Dr. JOHN C. HAMAKER Jr.

Vanadium-Alloys president, v. p.-technology

FRANK C. RABOLD

BERNARD D. BROEKER

Bethlehem Steel Co. appointments

eleine, Que., and Huntsville, Ala. He succeeds the late **Howard J. Daly.**

Dr. George A. Roberts was elected president and chief executive officer, **Vanadium-Alloys Steel Co.**, Latrobe, Pa., and **L. D. Bowman** was elected chairman. They fill posts of the late **James P. Gill. Dr. John C. Hamaker Jr.** succeeds Dr. Roberts as vice president-technology. He was director of research and metallurgical engineering. Mr. Bowman, newly elected chairman, has been vice president-production since 1945.

R. D. Rhodes was named director of industrial engineering for **Kollsman Instrument Corp.**, Elmhurst, N. Y., division of Standard Kollsman Industries.

James M. Kimbrough was appointed assistant general manager of sales, **Republic Steel Corp.**, Cleveland. **P. H. Pocock**, assistant manager, Sheet & Strip Div., was named to succeed Mr. Kimbrough as sales manager of that division.

Frank C. Rabold was made assistant to president and manager of the newly established, separate General Services Dept. at **Bethlehem Steel Co.**, Bethlehem, Pa. He was manager of the General Services Div., heretofore a part of the Financial & Legal Dept. **Bernard D. Broeker**, secretary of Bethlehem Steel Corp., and its subsidiary, Bethlehem Steel Co., was in addition made assistant vice president-financial and legal, of the subsidiary.

R. L. Boorman fills the new post of director, corporate planning and control for **Kaiser Steel Corp.**, Oakland, Calif.

John H. Dummer, director of foreign operations and affiliates for **International Resistance Co.**, Philadelphia, was elected a vice president.

Paul H. Magnus II was elected president of **Rosedale Foundry & Machine Co.**, Pittsburgh. Former executive vice president, he is succeeded by **Donald H. Ambrose. David C. Chaplin**, former president, becomes chairman and treasurer.

W. E. Cameron was promoted from chief equipment engineer to vice president-engineering at **Jered Industries Inc.**, Birmingham, Mich.

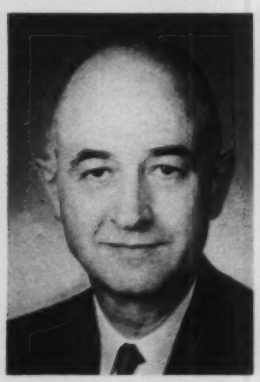
Francis J. McGinn was named sales manager for **IDL Photometric Products**, Attleboro, Mass.

G. F. Griffiths, president of **Acme Steel Co.**, Chicago, assumes duties of chairman following retirement of **G. T. Avery. T. J. Fullerton** succeeds **John E. Ott**, vice president (retired), in duties as director, New Products Development Div.

Carl L. Brockman was made director of engineering for **Gemco Inc.**, Los Angeles, subsidiary of Hupp Corp.

S. E. Weaver was appointed vice president-engineering and marketing, **Marquardt Corp.**, Van Nuys, Calif.

Harvey A. Tews was promoted to



JAMES M. KIMBROUGH

P. H. POCOCK

Republic Steel sales appointments

PAUL H. MAGNUS II

DONALD H. AMBROSE

Rosedale Foundry president, exec. v. p.

A NEW ADVANCE IN DURABLE FLAME RETARDANT WORK CLOTHES

It takes the optimum combination of fiber, fabric, and finish to make the best possible fire retardant work clothing . . . and this combination has been achieved in a new *Mount Vernon Safety Fabric.*

The fiber is cotton – the world's most comfortable fiber: cool, absorbent . . . with no static electricity and no melting at high temperatures.

The cloth is a MOUNT VERNON fabric specifically developed for this use. It is designed for high strength, resistance to tearing and abrasion, and maximum air porosity . . . and to retain these properties throughout the life of the garment.

The finish is Lynrus FR-1*. It chemically combines with the fiber and the cloth to produce *Mount Vernon Safety Fabric.* It provides durable flame resistance that will last for the life of the fabric whether it is laundered or drycleaned. *Mount Vernon Safety Fabric* will not support flame. Afterglow in charred areas is negligible.

Mount Vernon Safety Fabric is mildew resistant, wrinkle resistant, and has bacteriostatic properties which tend to inhibit perspiration odor development. It is non-allergenic, non-irritating, and non-toxic. Because the fabric is soft and flexible, without a trace of stiffness or harshness, it can be styled into smart, comfortable work clothes.

Mount Vernon SAFETY FABRIC

LYNRUS F.R.1*
Durable Flame Retardant Finish

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☐ a swatch of MOUNT VERNON SAFETY FABRIC, so I can test it myself.

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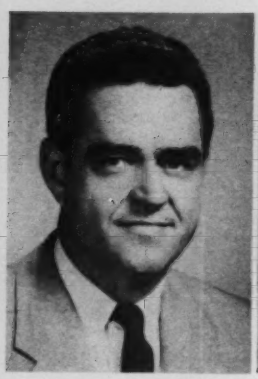
Michigan Tool div. mgr.

ROBERT C. WALLACE
White Motor div. post

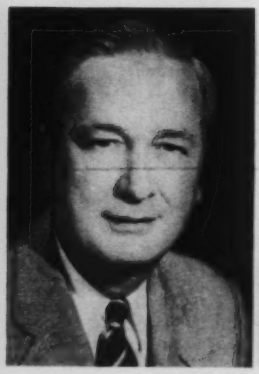
JOHN A. NEYENHOUSE Jr.
U. S. Steel Supply post



JOSEPH W. COLLIER
Latrobe production mgr.

RUSSELL M. WHEELER
Seneca Falls Machine post

DONALD B. BARTZ
Whirl-Air-Flow post



NORBERT E. WILLKOMM
J&L Warehouse sales

A. M. ANDREWS Jr.
Airco International pres.

JOHN W. COLLINS
Walworth president

plant manager at **Geuder, Paeschke & Frey Co.**, Milwaukee.

Norbert E. Willkomm fills the new post of manager-tubular sales, Steel Warehouse Div., **Jones & Laughlin Steel Corp.**, Pittsburgh. He was assistant manager of the warehouse division's Cleveland Steel Service Center. **Charles O. Kelley** joined J&L as sales manager, Cleveland Steel Service Center.

A. M. Andrews Jr. was appointed president of **Airco Co. International**, New York, division of Air Reduction Co. Inc. He succeeds **J. G. Bell**, retired.

John W. Collins was appointed president of **Walworth Co.** He continues as president of the subsidiary, Grove Valve & Regulator Co., Oakland, Calif., but will be at Walworth offices in New York.

Richard W. Hallock was made manager of **Michigan Tool Co.'s** Enterprise Div., Detroit. He was assistant to the manager of Manistee Iron Works Div., Manistee, Mich.

Robert C. Wallace was made director of engineering, Lansing, Mich., Div., **White Motor Co.** He was with the White Div.

John A. Neyenhouse Jr. was made general manager-strapping, **U. S. Steel Supply Div.**, Chicago, U. S. Steel Corp. In his newly created post, he is responsible for all strapping machine activities, including research and development, and manufacturing. **Thomas E. Gleason** was named chief industrial engineer for the division.

Joseph W. Collier was made manager of production at **Latrobe Steel Co.**, Latrobe, Pa. He was chief industrial engineer.

Seneca Falls Machine Co., Seneca Falls, N. Y., appointed **Russell M. Wheeler** manager of production and quality control, and **Arthur S. Dinsmore** chief engineer.

Donald B. Bartz was made chief engineer, **Whirl-Air-Flow**, Minneapolis, a newly established post.

George R. Miller was named product manager-tube and fittings, **Chase Brass & Copper Co.**, Waterbury, Conn., subsidiary of Kennecott Copper Corp. He succeeds **P. C. Barzler Jr.**, resigned.

Frank W. Considine was made general sales manager, **National Can Corp.**, Chicago.

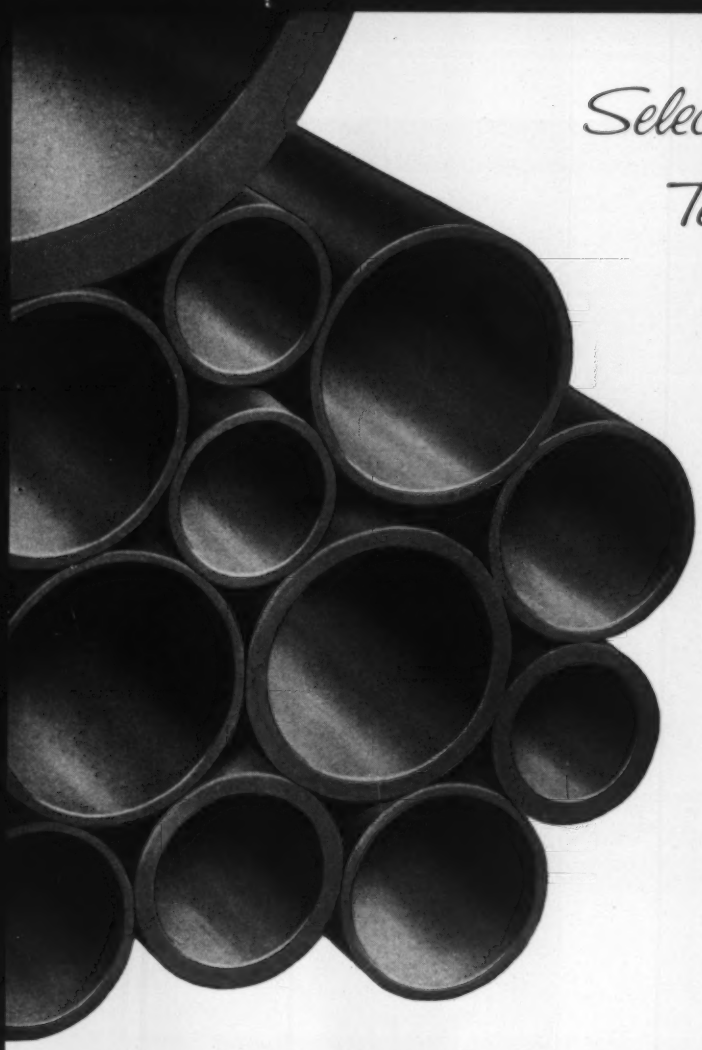
OBITUARIES...

James P. Gill, chairman and president, **Vanadium-Alloys Steel Co.**, Latrobe, Pa., died Oct. 30.

William A. Berenson, 73, assistant sales manager, **A. M. Castle & Co.**, in Milwaukee, died Oct. 23.

William A. Darrah, 72, founder and president of **Continental Industrial Engineers Inc.**, and vice president of **Lindberg Engineering Co.**, Chicago, died Oct. 29.

Richard G. Hext, 53, general sales manager and assistant to the president, **Brighton Corp.**, Cincinnati, died Oct. 24.



Selection of finest raw materials

Testing every step of the way

Inspection to rigid standards

Assure 100% dependability for

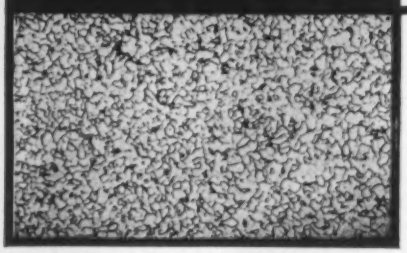
OHIO WELDED PRESSURE TUBING

You can be sure — doubly sure — of utmost tubing dependability when you specify Ohio Welded Pressure Tubing — *made by Ohio Seamless.* First, Ohio works to accepted industry standards — ASTM, ASME, and similar Federal and military specifications covering welded pressure tubing. Second, Ohio Welded Pressure Tubing is produced under a *continuous* process of quality control — not just a final test inspection to cull questionable material.

Carefully selected prime raw material is slit, edged, shaped and electric resistance welded on the most versatile and modern equipment in operation. At each and every step of the way Ohio Welded Pressure Tubing is under the scrutiny of Ohio's master tubemakers . . . making control tests at frequent intervals . . . testing random samples from each production order far beyond the limits of the usage involved.

For critical pressure piping applications . . . for condensers, heat exchangers, boilers and superheaters — in the range of sizes from ½ to 7½" OD and wall thicknesses from .028 to .375"— mark your prints "*Ohio Custom Made Welded Pressure Tubing.*" There is no equivalent.

Photographs show flare, flattening and crush tests performed continuously on every order. Non-destructive tests include air, water, magnetic, eddy current and visual inspection to insure 100% dependability.



Photomicrograph of polished and acid-etched surface shows perfect microstructure of normalized Ohio Welded Pressure Tubing. Weld area running down the center is now indistinguishable and tube has become, in every sense, weldless.

OHIO

OHIO SEAMLESS TUBE

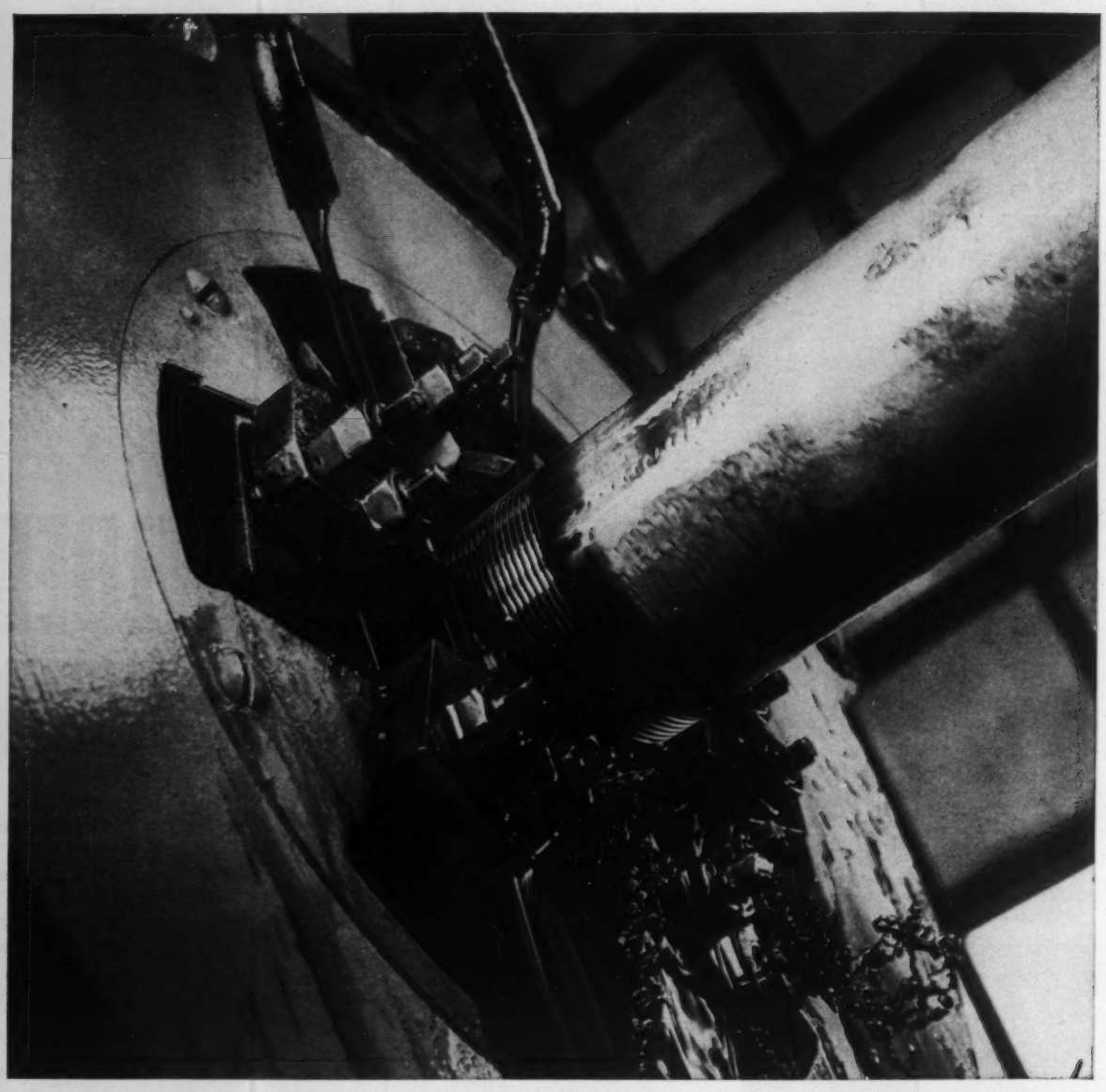
Division of Copperweld Steel Company

SHELBY • OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Representatives in principal cities. Check leading directories:
THOMAS', MacRAE'S, CONOVER-MAST, SWEET'S, FRASER'S.

A-2000A



HOW TO CUT THE COST OF CUTTING!

Esso supplies a wide range of special and multi-purpose products designed to save you money on tool replacement, to boost output, and to reduce downtime...

PENNEX® cutting oils provide low tool wear in threading, tapping, and machining operations on ferrous metals. They are compounded with fatty materials for peak cutting efficiency; offer high sulfur activity for fine surface finishes.

NEBULA® EP multi-use grease serves *all* grease-lubricated parts, even those which require extreme pressure properties. Nebula EP has excellent oxidation stability, works well at high temperatures, and simplifies handling by replacing many single-purpose greases.

NUTO® high-quality hydraulic and circulating oils give effective protection against rust and oil breakdown; do a top-notch lubricating job in gear drives, bearings, and circulating systems.

Your Esso Representative can help you cut costs in many areas of your operations. Give him a call, or write us at 15 West 51st Street, New York 19, New York.

HUMBLE OIL & REFINING COMPANY **Esso**

J&L to Build $60 Million Strip Mill at Cleveland

JONES & LAUGHLIN Steel Corp. will install an 80 in., hot strip mill costing about $60 million at its Cleveland Works Div. The facility will be erected adjacent to the existing mill which will be deactivated when the new mill goes into operation late in 1963.

The six finishing stands of the new mill will produce coils of sheet steel at speeds up to 3750 fpm. The coils, up to 74 in. wide, will weigh as much as 30 tons.

Principal users of such sheets and coils are the automotive and major appliance industries. "Some of our keenest competition is in those markets," says Avery C. Adams, president, "where continued advances in design make demands on us for the highest standards of quality and uniformity."

• **Better Finish** — Uniform high quality surface finish on steel sheets and larger coils of sheets demanded by customers for their production lines, will be possible when the new mill goes into operation, Mr. Adams says.

Several new buildings will be constructed to house the facility. The improvements will require new coilers to handle the steel as it leaves the finishing stands of the hot strip mill and new coil handling facilities between the strip mill and the cold rolling mills, where the larger coils are further processed.

The new mill will increase total expenditures by J&L in its current program at Cleveland to more than $300 million. Koppers Co. Inc., Pittsburgh, is constructing a blast furnace at the Cleveland Works which will be operative in 1963. It will be the firm's largest unit (50,000 cu ft working volume) and will have a hearth diameter of more than 28 ft (STEEL, Oct. 9, p. 186).

Steel to be processed on the new strip mill will be produced in a huge, two furnace, basic oxygen shop which went into operation recently at the Cleveland Works. (STEEL, Nov. 6, p. 84.) The furnaces are 27 ft 10.5 in. high and 21 ft 8.5 in. in diameter at the widest point. The mouths of the furnaces are 7 ft in diameter. The units have produced up to 240 tons of quality steel in as little as 59 minutes.

Russell, Burdsall & Ward Opens New Service Center

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has established the Fastening Service Center of Kansas City (Mo.) Inc. Stocking a 500 ton inventory that includes more than 15,000 different fastening products, the center represents a new approach to the distribution of fasteners. It brings many of the major U. S. brands of industrial fasteners together under one roof.

FSC will stock the complete line of RB&W fasteners, ESNA elastic stop nuts and roll pins, H. M. Harper nonferrous and stainless products, and wrought washer flat, structural, and hot dip galvanized washers. The inventory will also include Brighton socket cap and set screws; Pop rivets from United Shoe Machinery; zinc alloy wing and cap nuts from Gries Reproducer; Merrill Mfg. wire goods; turnbuckles and eyebolts from Chicago Hardware & Fixture; the screw products of Southern Screw Co.; Western Wire cotter pins; MacLean-Fogg lock nuts; and Philadelphia Steel & Wire lockwashers.

Reliance Joins Schindler In European Venture

Schindler - Reliance Electronics Ltd. has been formed in Lucerne, Switzerland, as a joint venture of Reliance Electric & Engineering Co., Cleveland, and Schindler & Co. Ltd., Lucerne. The new company will develop the business of engineered drives and electronic controls in the European Common Market and the free trade areas. A $1 million plant

(*Please turn to Page* 144)

Hyde Park
STRETCHER LEVELLERS

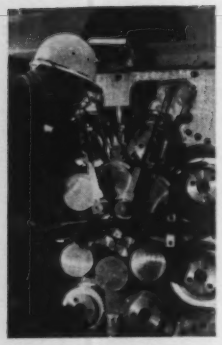
Hyde Park Levellers have a complete range of stretching capacities from 150 to 1250 tons—for levelling ferrous and non-ferrous sheets in sizes up to 120 inches wide by 500 inches long.

Adaptable for automatic cycling.

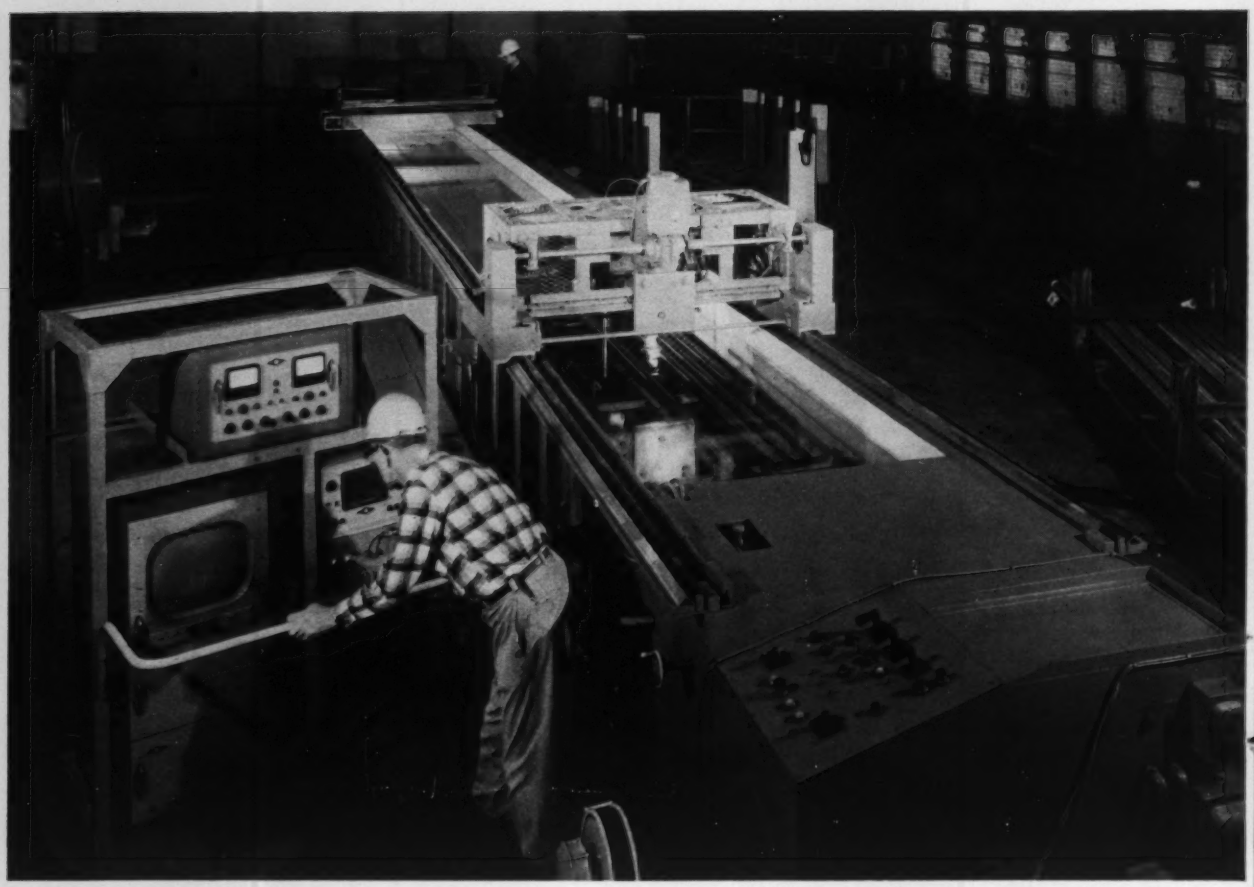
Pneumatically or hydraulically operated wedge or toggle type jaws.

Hyde Park
FOUNDRY AND MACHINE CO.
HYDE PARK
Westmoreland County, Penna.

Rolls
Rolling Mill Equipment
Gray Iron Castings



What Armco's advanced array and inspection equipment



Bells ring, lights flash and pictures appear on the TV screen when stainless steel bars or billets with subsurface defects are dunked in Armco's "electronic bathtub." It's part of Armco's ultra-modern stainless production and inspection equipment, among the most advanced in the nation.

New steels are born at Armco

# of Stainless Steel production means to you

Wider selection plus high quality you can count on in stainless steel sheets, strip, bars and wire. That's what Armco's modern stainless production and inspection facilities offer you.

Wider Selection—These, for example, are a few recent additions to Armco's already great variety of stainless steels: Continuous mill produced sheets up to 48 inches wide; cold-rolled and temper-rolled plates up to 72 inches wide and 216 inches long; range in bright annealed strip increased to 12 different grades.

High Quality You Can Count On—At every production step, Armco uses the newest special inspection and control methods to assure you of cost-saving uniformity during fabrication. In Armco Stainless Bars, for example, *controlled uniformity* means fewer tool adjustments and costly rejects in your shop.

For durability, strength, economy.

This is only part of the story, but we'll be happy to give you complete information on Armco's full range of stainless steels. Write us or contact a distributor of Armco Stainless Steels listed on this page. **Armco Division, Armco Steel Corporation, 2071 Curtis Street, Middletown, Ohio.**

ARMCO **Armco Division**

GET SELECTION AND QUALITY IN ARMCO STAINLESS FROM THESE STEEL SERVICE CENTERS

(A) Sheets, Strip and Plates (B) Bars and Wire

AMERICAN STEEL & ALUMINUM CORP. (AB)
Hartford, Conn.

AMERICAN STEEL & ALUMINUM CORP. OF MASS. (AB)
Cambridge, Mass.

BROWN-WALES COMPANY (AB)
Cambridge, Mass.—Auburn, Maine—Worcester, Mass.

CENTRAL STEEL & WIRE COMPANY (AB)
Chicago, Ill.—Cincinnati—Detroit—Milwaukee

CHICAGO STEEL SERVICE COMPANY (AB)
Chicago, Ill.

CLEVELAND TOOL & SUPPLY COMPANY (B)
Cleveland, Ohio

THE CONGDON AND CARPENTER COMPANY (AB)
Providence, R. I.—Fall River, Mass.—Natick, Mass.

C. A. CROSTA, INC. (A)
Denver, Colo.

DUCOMMUN METALS & SUPPLY COMPANY (AB)
Los Angeles, Calif.—Berkeley—Phoenix—San Diego—Seattle

EDGCOMB STEEL & ALUMINUM CORP. (AB)
Hillside, N. J.

EDGCOMB STEEL COMPANY (AB)
Philadelphia, Pa.—Charlotte, N. C.—Greensboro, N. C.—York, Pa.

ESCO CORPORATION (AB)
Portland, Oregon—Denver—Emeryville, Calif.—Eugene, Oregon—Honolulu—Los Angeles—Seattle—Spokane—Vancouver, B. C.

PETER A. FRASSE & COMPANY, INC. (AB)
New York, N. Y.—Buffalo—Hartford—Lyndhurst, N. J.—Philadelphia—Syracuse

FIRTH BROWN STEELS LTD. (AB)
Montreal, P. Q.—Toronto

GATE CITY STEEL, INC.—OMAHA (AB)
Omaha, Nebr.—Columbus, Nebr.

INDUSTRIAL STAINLESS STEELS, INC. (B)
Cambridge, Mass.—Buffalo, N. Y.

EARLE M. JORGENSEN COMPANY (AB)
Los Angeles, Calif.—Dallas—Denver—Honolulu—Houston—Oakland—Phoenix—Seattle—Tulsa—Wichita

MAPES & SPROWL STEEL COMPANY (AB)
Union, N. J.

METAL GOODS CORPORATION (AB)
St. Louis, Mo.—Dallas—Denver—Houston—Memphis—New Orleans—N. Kansas City, Mo.—Tulsa—Wichita

MONCRIEF-LENOIR MFG. COMPANY (AB)
Houston, Texas—Dallas—Harlingen—Lubbock—San Antonio—Temple

MORRISON STEEL COMPANY (AB)
New Brunswick, N. J.

THE ORLEANS STEEL PRODUCTS COMPANY, INC. (A)
New Orleans, La.

WILLIAM M. ORR COMPANY, INC. (AB)
Pittsburgh, Pa.

PAPER-CALMENSON & COMPANY (A)
St. Paul, Minn.

SEABOARD STEEL & IRON CORP. (B)
Baltimore, Md.

SENECA STEEL SERVICE, INC. (AB)
Buffalo, N. Y.—Jamestown, N. Y.

SOUTHER STEEL & ALUMINUM COMPANY (A)
St. Louis, Mo.

J. M. TULL METAL & SUPPLY CO., INC. (AB)
Atlanta, Ga.—Birmingham—Greenville, S. C.—Jacksonville—Miami—Tampa

VIKING STEEL COMPANY (AB)
Cleveland, Ohio

VORYS BROTHERS, INC. (AB)
Columbus, Ohio

YORK CORRUGATING COMPANY (A)
York, Pa.—Washington, D. C.

(*Concluded from Page* 141)

will be built at Dierikon, a suburb of Lucerne.

When the complex in Europe is in full operation, about 25 per cent of European sales will be to U. S. companies located overseas, says E. E. Helm, president of Reliance. The remainder will go to foreign customers. E. S. Winkler is general manager of the new company.

Sales Up, Capacity Trebled

A 30 per cent boost in sales over the last year has prompted National Copper & Smelting Co., Cleveland, to triple capacity of its Solon, Ohio, plant. A feature of the planned 100,000 sq ft addition will be a new crane bench for drawing five copper tubes at once at speeds up to 500 ft per minute. When finished, the firm will vacate its present quarters on E. 123rd Street in Cleveland.

Plant Size Doubled

Chemical milling of parts for aircraft and space projects will be housed in a 30,000 sq ft addition which will double the size of the Gardena, Calif., plant of Chemical Contour Corp., Gardena. Construction will be finished next February. About one-third of the new quarters will be used for chemical milling of aluminum wing components for the Boeing 727, commercial jet transport.

NEW PLANTS

Uddeholm Co. of America Inc., New York, opened a Specialty Steel Service Center at 1400 Nicholas Blvd., Elk Grove Village, Ill.

Enterprise Foundry Co. Ltd., Sackville, N. B., opened display rooms, offices, and a warehouse at 830 King Edward St., Winnipeg, Man. The firm makes stoves and heating systems.

Rish Equipment Co., Bluefield, W. Va., subsidiary of Bluefield Supply Co., has opened a heavy equipment parts and repair center in Hopedale, Ohio. It's the firm's seventh Ohio plant.

Allied Research Products Inc., Baltimore, opened a warehouse and

"PASSING THE BATON"— FROM WHITING TO WHITING

The big Whiting Distributing Ladle has been storing the melt. Slag, rising to the top, has hardened to form a natural lid and retain the heat below. Now the "baton"—a stream of slag-free metal—is passed through the outside teapot spout into a Whiting Pouring Ladle with bottom tap for final relay to the molds.

This scene is typical of efficient foundry operations throughout the world. Whiting engineers, practical foundrymen themselves, have designed more than 200 types and models of metallurgical ladles to reduce costs, speed output and improve casting quality in every pouring operation. If you have a special need, they'll design a special ladle to meet it precisely. And there is no charge for this service. See your local Whiting rep or write direct.

FREE: Bulletin FY-163-R, *WHITING LADLES.* Forty pages of illustrated ladle models and accessories to cut your casting costs. Write for it today. *Whiting Corporation, 15643 Lathrop Avenue, Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.*

90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

WHITING

MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES®; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT

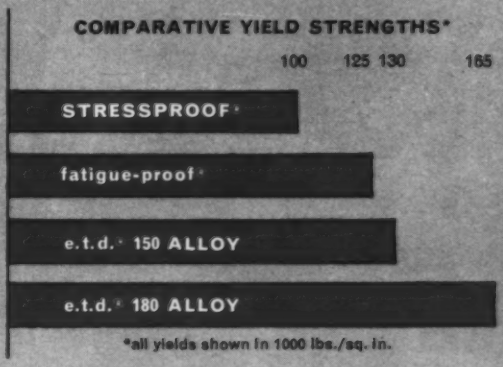
FOUNDRY EQUIPMENT

Use These LaSalle Specialty Steel Bars to...

GET STRENGTH IN MACHINE PARTS WITHOUT HEAT TREATMENT!

Here's a better way to make strong machine parts . . . a way that cuts production costs, eliminates operations, and gives you improved reliability. Many successful manufacturers use these bar steels, made exclusively by LaSalle, for parts previously heat treated in the range of Rc 20 through Rc 43.

Designers say that better uniformity across the section makes possible lighter weight and smaller diameter parts. They get needed strength and avoid the soft centers so often present in quenched and tempered bars. Machinability is excellent, too.



STRESSPROOF®
WITH COPPER

Yield Strength: 100,000 psi guaranteed minimum in all sizes.

Hardness: For parts now being heat treated up to Rockwell C 30.

fatigue-proof® e.t.d.®
elevated temperature drawing

Ultimate Tensile Strength: 140,000 psi guaranteed minimum.

Yield Strength: 125,000 psi guaranteed minimum.

Hardness: Rockwell C 30 guaranteed minimum.

e.t.d. 150
elevated temperature drawing

ALLOY STEEL BARS

Ultimate Tensile Strength: 150,000 psi guaranteed minimum.

Yield Strength: 130,000 psi guaranteed minimum.

Hardness: Rockwell C 32 guaranteed minimum.

e.t.d. 180
elevated temperature drawing

ALLOY STEEL BARS

Ultimate Tensile Strength: 180,000 psi guaranteed minimum.

Yield Strength: 165,000 psi guaranteed minimum.

Hardness: Rockwell C 38 guaranteed minimum.

Use this coupon to request technical literature. Check bulletins wanted:

- ☐ Bulletin 15 on STRESSPROOF
- ☐ Bulletin 10 on FATIGUE-PROOF
- ☐ Bulletin 22 on "e.t.d." 150
- ☐ Bulletin 23 on "e.t.d." 180

La Salle STEEL CO.
1414 150th Street
Hammond, Indiana

name_____

title_____

company_____

address_____

city_____ zone_____ state_____

AUTOMATIC BRUSHING SETUP buffs mirror finish on 12" wrench parts for plating. Multiple parts are mounted in special removable fixture. Machine automatically positions and oscillates parts between brushing heads for 25 strokes per cycle. Each head is made up of 65 Osborn Bufcut® treated cord brushes.

MIRROR FINISHING wrenches

nine at a time with OSBORN power brushing

This leading tool manufacturer uses Osborn power brushing to buff a mirror finish on forged steel wrenches, pliers and chisels before plating.

Pre-mounted in multiples on removable fixtures, the tool parts are buffed in a special machine which automatically lowers and oscillates the parts between two Osborn Bufcut® brushing heads. The operation is simple, fast, inexpensive. This method has been in continuous use in this plant for nearly 12 years—*still proves to be the best way to do the job today.*

It's a typical example of how Osborn power brushes and brushing methods—through years of exceptional, dependable service—are handling industry's tough metal finishing jobs. If you have a metal finishing problem—deburring, cleaning, polishing, precision blending—an **O**sborn **B**rushing **A**nalysis, made in your plant at no obligation, can pinpoint the answer. *Write or call The Osborn Manufacturing Company, Dept. S-41, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

service laboratory at 35 Holland Ave., Bridgeport, Conn. The firm makes chemicals, equipment, and supplies for the metal finishing industry. L. Frank Richard is district sales manager.

ASSOCIATIONS

Pressed Metal Institute, Cleveland, changed its name to **American Metal Stamping Association.** J. D. Keith is managing director.

National Tool, Die & Precision Machining Association, Cleveland, elected these officers: President, J. D. Dewhurst, Arrow Tool Co. Inc., Wethersfield, Conn.; first vice president, R. H. Berg, Atols Tool & Mold Corp., Schiller Park, Ill.; second vice president, F. D. Wright, Fred D. Wright Co. Inc., Nashville, Tenn.; treasurer, DeWitt L. Bills, World Tool & Engineering Co., Minneapolis; and secretary, D. J. Bathgate, Oval Tool & Die Corp., Detroit.

National Metal Trades Association, Chicago, elected these officers: President, B. M. Walter, Clark Equipment Co., Buchanan, Mich., and treasurer, John A. Bradner, Lees-Bradner Co., Cleveland. Three regional vice presidents were elected: J. H. Lyman, Geartronics Corp., Woburn, Mass.; D. F. Palmer, C. H. Wheeler Mfg. Co., Philadelphia; and J. C. Skinner, Thomas & Skinner Inc., Indianapolis.

Roger E. Gay, former president of the Bristol Brass Corp., will succeed Vice Adm. G. F. Hussey Jr. (USN ret.) as managing director of the **American Standards Association,** effective January, 1962.

National Management Association, Dayton, Ohio, elected these officers, effective Jan. 1, 1962: President, L. F. Magruder, Talon Inc., Meadville, Pa.; first vice president, J. K. Christoph, Lockheed Aircraft Corp., Sunnyvale, Calif.; secretary-treasurer, H. E. Hauser, Tool Steel Gear & Pinion Co., Cincinnati.

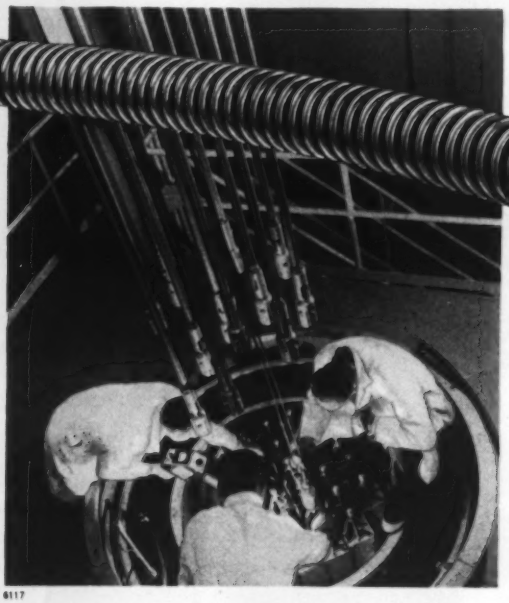
Aluminum Smelters Research Institute, Chicago, elected these officers: President, D. H. Warner, Aluminum & Magnesium Inc.,

"Scram" Springs Halt Nuclear Hazards

Whether installed in a ship for propulsion, or on land for electric-power generation, a nuclear reactor running wild is highly dangerous. In case of malfunction or overload, neutron-absorbing rods must be driven fast into the nuclear pile to halt fission.

For emergency scramming or driving the rods, the mechanical system utilizing coil springs offers a high degree of safety, reliability, and performance. The springs are under constant load while the reactor is operating, and stability under load is mandatory. They must retain their strength at high stress levels and show minimum load loss at temperatures beyond even 500°F. The material must be highly corrosion resistant and relatively unaffected by radiation.

Meeting exacting precision and performance requirements is no novelty for A.S.C. springmakers. From nuclear applications to automobiles and home appliances, A.S.C. Divisions offer engineering, mechanical and metallurgical resources unequalled in the spring industry. If such broad experience can be of benefit in your present or future developments, call in an A.S.C. Division.



6117

"Scram" springs act in emergency conditions to drive neutron-absorbing rods into the nuclear pile to halt fission.

Tight specifications and controls govern the "scram" spring from wire to finished product. During each stage of manufacture, tolerances are carefully checked by precision instruments.

Associated Spring Corporation

General Offices: Bristol, Connecticut

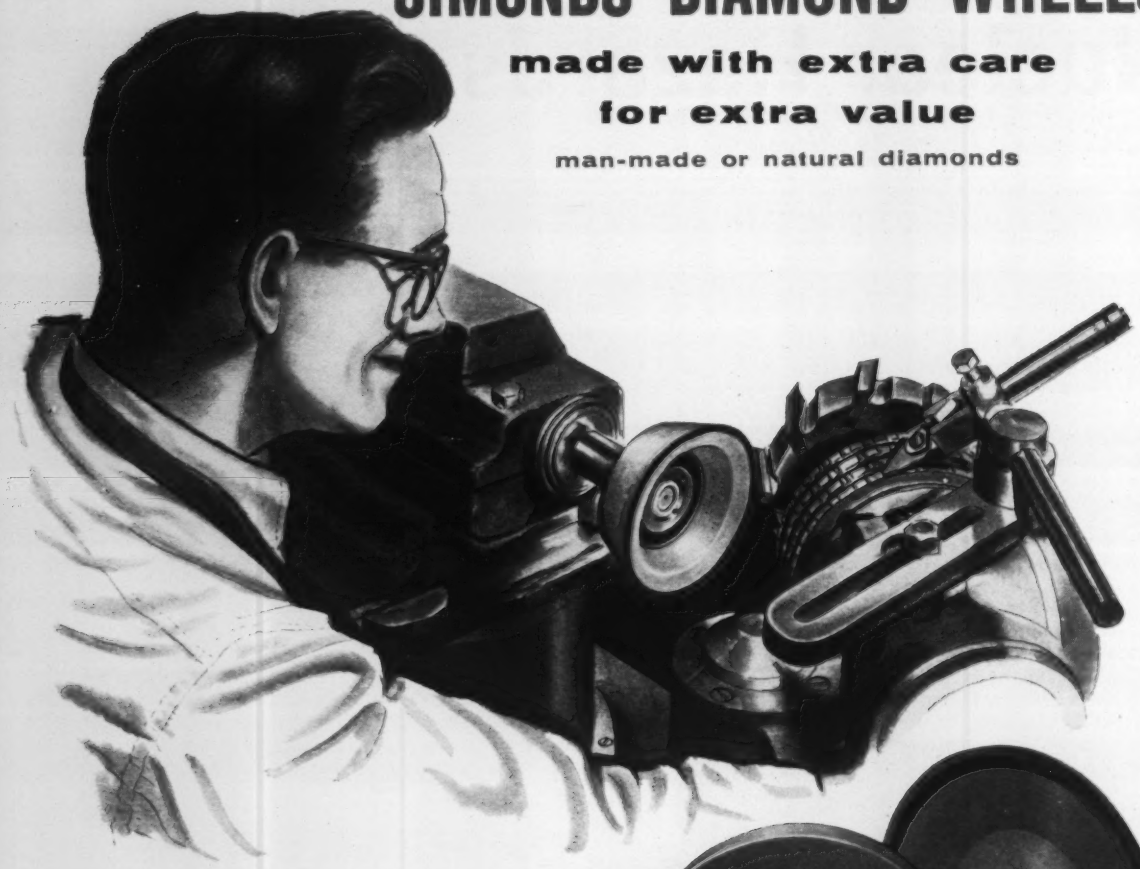
Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
F. N. Manross and Sons Division, Bristol, Conn.
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
Merchandise Division, Corry, Penna.
Raymond Manufacturing Division, Corry, Penna.
Cleveland Sales Office, Cleveland, Ohio
Chicago Sales Office, Chicago 46, Ill.
Ohio Division, Dayton, Ohio
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Mattoon, Ill.
Milwaukee Division, Milwaukee, Wis.
Seaboard Pacific Division, Gardena, Calif.
Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que.

When the job calls for DIAMONDS... say SIMONDS

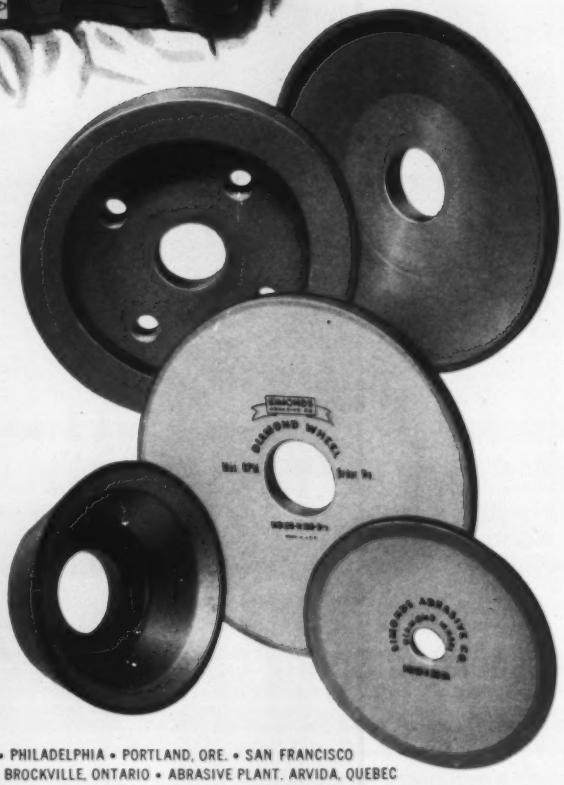
SIMONDS DIAMOND WHEELS

made with extra care
for extra value

man-made or natural diamonds



You get *extra* use from Simonds wheels because more of the diamonds are *productively* used for actual grinding. That's due to the extra care that goes into their manufacture . . . extra-demanding quality controls, modern techniques and the most accurate equipment . . . extra care that provides better balance and truer running, and consequently, fewer dressings. Special core material in resinoid bonded wheels also needs little or no dressing back as the diamond depth is consumed. Made with true and exact concentrations, and available in all shapes, sizes and bonds. Job-proved grain and grade specifications.
Send for catalog ESA-290.



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Sandusky, Ohio; vice president, R. K. Arundale, William F. Jobbins Inc., Aurora, Ill.; and treasurer, G. M. Baumann, Federated Metals Div., Alton, Ill., American Smelting & Refining Co. Carl H. Burton is secretary.

NEW OFFICES

Sandvik Steel Inc., Fair Lawn, N. J., has established a branch office at 2208 White-Henry-Stuart Bldg., Seattle 1, Wash. Raymond F. Nelson is district manager.

Kaiser Aluminum International of Kaiser Aluminum & Chemical Corp. announces these new offices for its sales affiliates: For **Kaiser Aluminum Maatschappij N.V.** at Coolsingel 75, Rotterdam, Holland, with Hans Schwengler as manager; for **Kaiser Aluminium Co. Ltd.** at Lichfield House, Ringway, Birmingham, England, in charge of A. P. Hilliam.

CONSOLIDATIONS

O. S. Walker Co., Worcester, Mass., acquired **F. W. Shrader Co.**, Los Angeles, manufacturer of electro and permanent magnetic equipment. R. F. Carey has been named executive vice president of Shrader. He is also general manager of Bux Magnetic Products Inc., San Jose, Calif., which is expected to be eventually consolidated with the Shrader firm.

Warner & Swasey Co., Cleveland, purchased **Lahr Machine & Tool Corp.**, Toledo, Ohio. The property will be operated as the Lahr Machine Div. of the Cleveland firm.

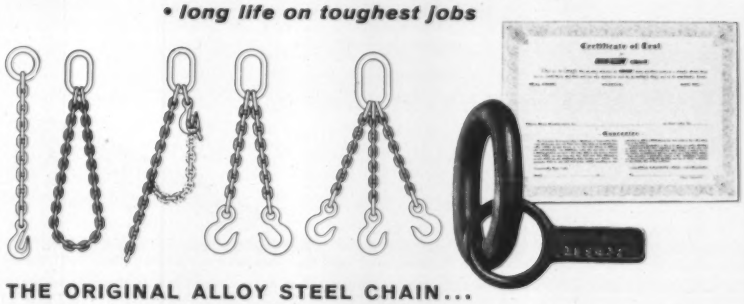
Raytheon Co., Lexington, Mass., is negotiating for the purchase of **Rheem Semiconductor Corp.**, Mountain View, Calif., a subsidiary of Rheem Mfg. Co. The leased plant at Mountain View contains 100,000 sq ft of floor space.

E. W. Bliss Co., Canton, Ohio, is acquiring **Portland Copper & Tank Works Inc.**, Portland, Maine, fabricator of stainless steel and high temperature alloys and a manufacturer

(*Please turn to Page 152*)

for the man who wants everything in chain

- *high resistance to impact loading*
- *maximum safety for overhead lifting*
- *lighter weight for easier handling*
- *long life on toughest jobs*



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FIRST TO BE TESTED, REGISTERED AND GUARANTEED

A Certificate of test including guarantee is issued for each new Herc-Alloy Sling Chain shipped from our factory. A metal registration tag is permanently attached bearing the serial number which is recorded in our engineering files with full details about your chain.

FIRST CHOICE WITH EXPERIENCED CHAIN BUYERS SINCE 1933

Herc-Alloy is made from a special analysis alloy steel and is heat treated by an exclusive process. Links are electrically welded by the time-tested Inswell electronically controlled method. All attachments are alloy steel including those to your specifications which are forged in our own shop. Everything about Herc-Alloy spells B-E-S-T. Best for you. Best specify Herc-Alloy.

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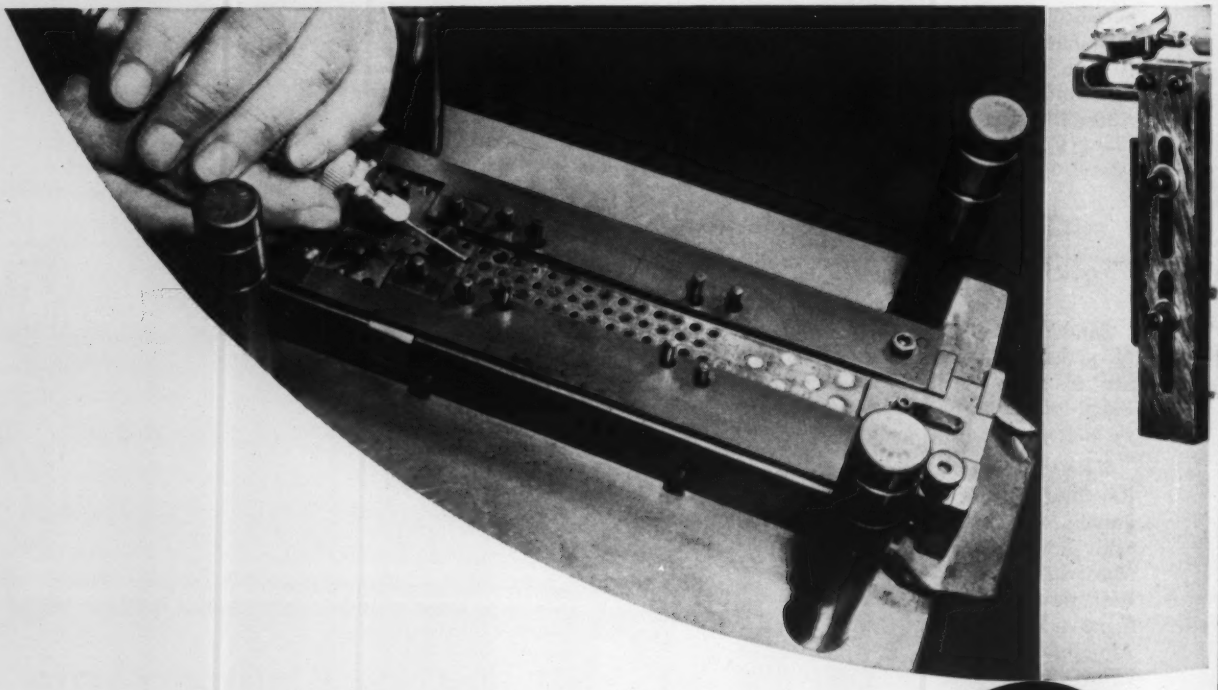
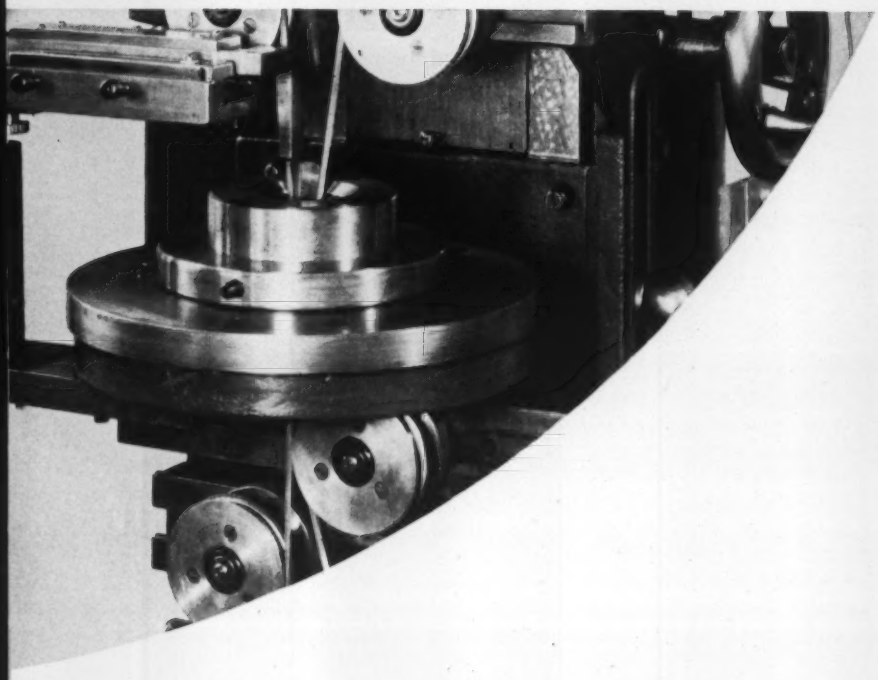
New York (Mountainside, N.J.), Chicago, Cleveland, San Francisco
In Canada: **Columbus McKinnon Limited, St. Catharines, Ont.**



Grinding Ceramic Wafers *(below) for nuvistor tubes. Two diamond wheels finish 2000 wafers per hour for Electron Tube Division of RCA. Wheels remove 0.003" stock from each surface simultaneously. Previous method using abrasive belts ground only one surface at a time, resulting in nonuniform results and stoppages. Expected life of wheels: 5,000,000 wafers.*

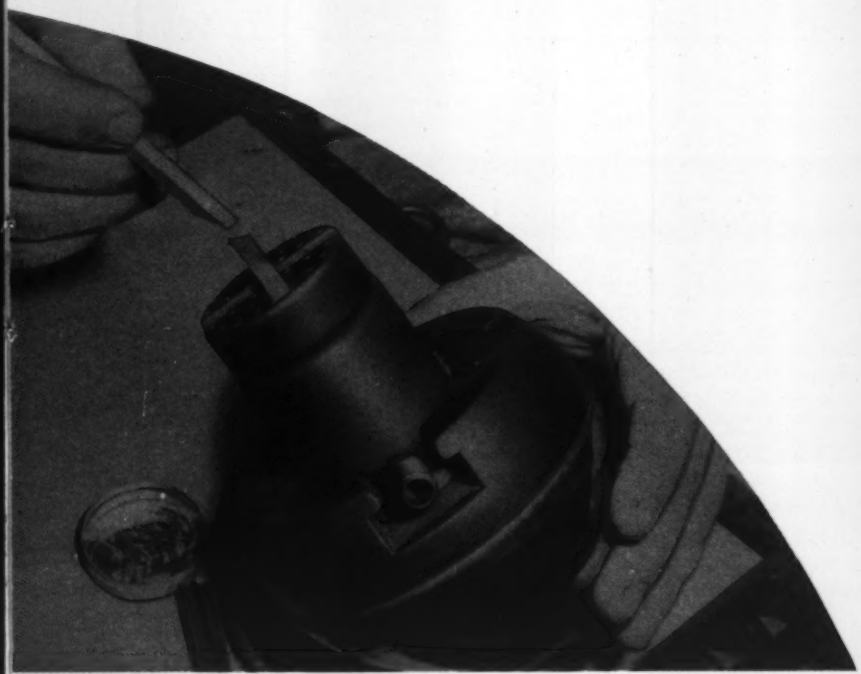
Servicing High-Speed Carbide Dies *(above). Jacoby Bender Inc. makes expansion watch bands. Their dies are for precious and semiprecious metals, as well as stainless steel. Finished products must have flawless finish. Small diamond quills from size .020" to ¼" diameter are used to build and service carbide dies. Grinders also cut decorative relief in some dies.*

Industrial diamonds cut practically everything... especially your production costs



Polishing Drawing Dies *(above)* ▲ *for Chase Brass & Copper. Die-polishing job that once required 2 to 6 hours' handwork is now finished in 15 minutes with diamond belt polisher. Accuracies and surface finishes are also greatly improved. Belts are impregnated with 100, 200 or 300 mesh natural diamond grit. Up to 200 dies have been serviced by a single belt.*

Putting Mirror Finish *(below) on hardened steel part for a forming die at Jacoby Bender. The natural diamond micron powder is applied with a wooden lap. The diamond paste speeds up the polishing operation, and has less tendency to distort the true form of the tool-steel than methods previously used.* ▼



Considering how well natural diamonds do these jobs may give you ideas

The four grinding and polishing jobs shown here span the fields of electronics, jewelry making, and metalworking. But they have one thing in common: in every case, natural industrial diamonds are doing the job quickly, economically and well.

In diamonds, you find this unique combination of properties: excellent cutting ability coupled with fantastic endurance.

Result: your diamond tools last longer than any other tools you can use. Your people spend more time producing, less time changing tools.

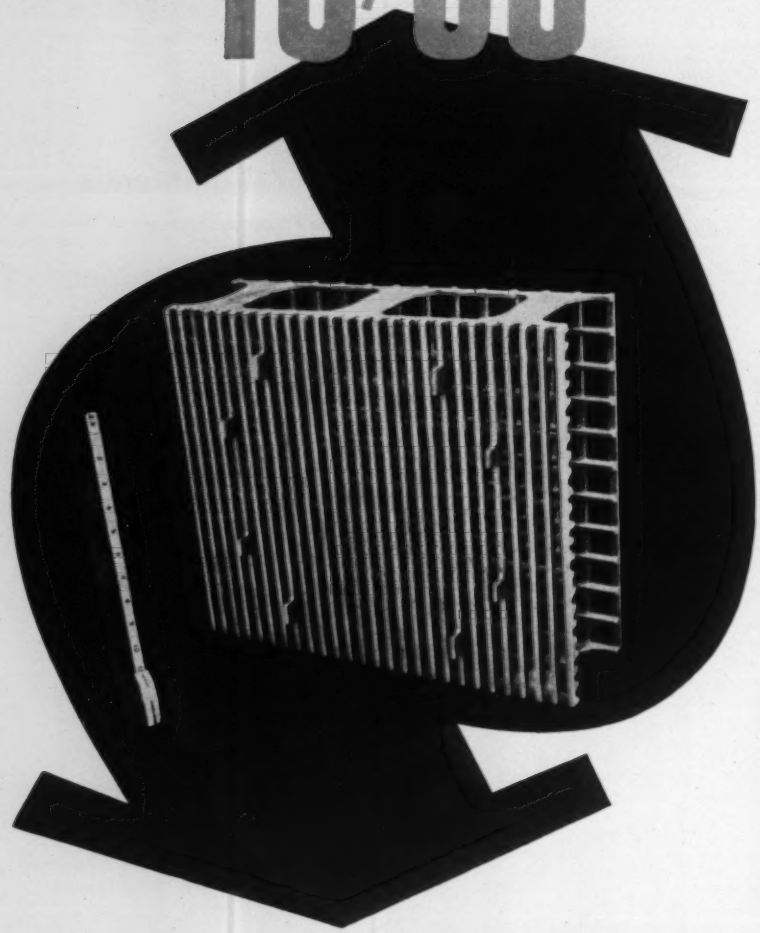
If you cut, sharpen or smooth in your business, you quite probably can use natural diamonds to advantage. Test them against the method you're now using. You will see how efficient — and economical—a diamond can be, especially now.

Best grit for metal-bond wheels developed by the Diamond Research Laboratory in Johannesburg

A new impact crushing method for natural diamonds is now producing the strongest and most durable diamond grit ever obtained for metal-bond wheels. Your tool and wheel manufacturer is ready to help you select the diamond tool that's right for *your* job.

Industrial Distributors (Sales), Ltd.

An intricate 15/35 casting—



—cast exceedingly well!

It's a carburizing furnace fixture, alloyed in the HT group for use in the automotive parts industry.

If a high alloy casting experience beginning in 1922 has any meaning—if having modern facilities in the three major casting types (static, centrifugal and shell-molded) has any meaning—if being in a position to provide any degree of finish desired has any meaning—that meaning is that you will get from Duraloy sound castings properly alloyed.

We can produce single castings up to 10 tons or assembled units to any size or shape that can be shipped and handled in transit. Bulletin G-261.

DURALOY

ALLOY CASTING INSTITUTE ACI MEMBER

DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
CHICAGO OFFICE: 332 South Michigan Ave., Chicago, Ill.
DETROIT OFFICE: 1025 Maple Road, Troy, Michigan
HOUSTON OFFICE: 4101 San Jacinto, Houston 4, Texas

(*Concluded from Page* 149)

of major jet engine assembly components and missile ground handling equipment.

Avis Industrial Corp., Detroit, acquired **Columbia Metal Box Co. Inc.**, New York, manufacturer of products for the home and electrical industry, including panel and switch boxes, wireways, metal conduits, and fittings. Avis makes electrical and automotive equipment.

John W. Bolton & Sons Inc. and its **Emerson Mfg. Co.** division, Lawrence, Mass., purchased the **Sheppard Plate & Machine Works**, Atlanta. As a result of this acquisition, Bolton-Emerson Southern Inc. has been formed as a new corporation affiliated with the parent company.

NEW ADDRESSES

Superior Steel Div., Copperweld Steel Co., Carnegie, Pa., moved its Western New York district office from Buffalo to 420 E. Genesee St., Syracuse 2, N. Y.

Union Tank Car Co. moved its headquarters to 111 W. Jackson Blvd., Chicago 4, Ill.

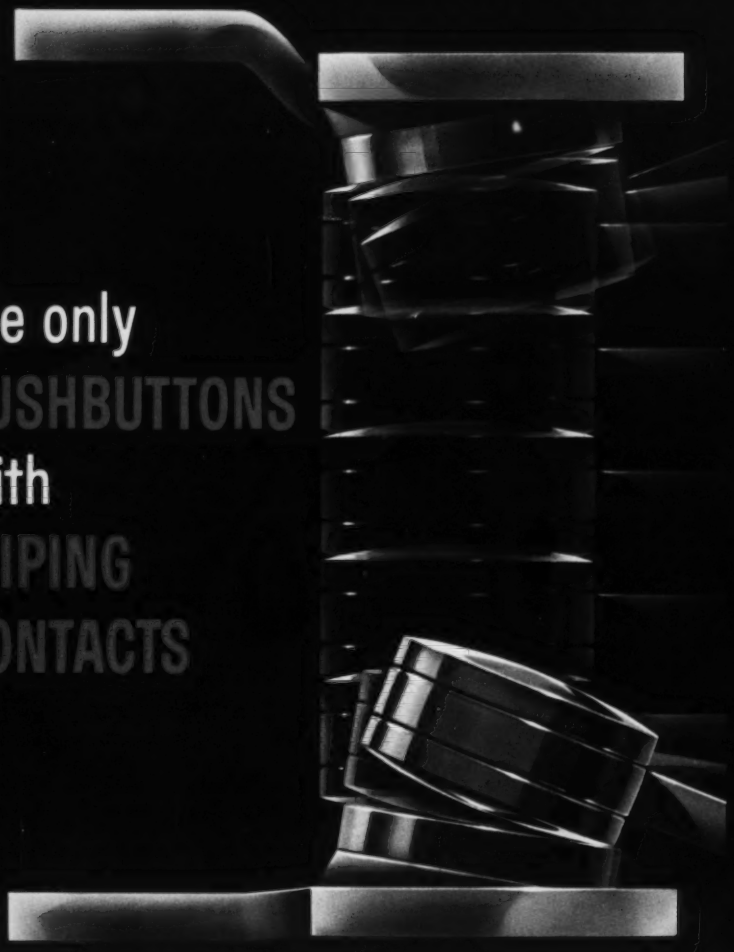
H. J. Ruesch Machine Co. moved its plant and offices to 35 Fadam Rd., Springfield, N. J. The firm makes metalworking machinery. The plant greatly increases the firm's floor space and adds potential of doubling plant capacity.

Handy & Harman, New York, fabricator and refiner of precious metals, has moved its Providence, R. I., plant from 425 Richmond St., to 845 Waterman Ave., East Providence, R. I.

Morris Coupling & Clamp Co. moved to 2345 Warfel Ave., Erie, Pa. The company makes compression pipe couplings and repair clamps for water, oil, and pneumatic conveying systems.

Gevaert Co. of America Inc. moved its district office and warehouse to 5225 E. 38th Ave., Denver 7, Colo. Ralph Bennett is district manager.

the only PUSHBUTTONS with WIPING CONTACTS



STANDARD PUSHBUTTON

SELECTOR SWITCH

PUSH-TO-TEST LIGHT OR LIGHTED PUSHBUTTON

PILOT LIGHT

Touch a finger to any Clark pushbutton, and there's positive response *every* time.

Why are Clark control units more dependable than others? Because, with each operation, the fine silver contacts are cleaned. The rolling, wiping action between the movable and stationary contacts as they make or break the circuit, wipes off any dust or non-conducting film that may be present. It's a Clark exclusive.

But this is only one of many features that make Clark pushbutton units the most reliable and versatile on the market. Ask your Clark distributor or sales representative to show you how the sturdy construction, ease of wiring and maintenance, and flexibility will help solve *your* pushbutton problems. 61PB2

COLORS? YOU NAME IT, WE'VE GOT IT! You can select from seven different colors for your pushbutton operators, lenses and ferrules. Groups of related control units can be coded by ferrule color, specific functions by operator color—another Clark original to help simplify otherwise complicated control stations. With Clark's complete line of control units, utilizing interchangeable operators, ferrules and nameplates, you have a virtually unlimited number of combinations of electrical functions and colors from which to choose.

THE CLARK CONTROLLER COMPANY

MAIN PLANT: CLEVELAND, 10 • **WESTERN PLANT:** LOS ANGELES, 58
IN CANADA: CANADIAN CONTROLLERS, LIMITED, TORONTO, ONTARIO

Here is a major breakthrough in sealing air cylinders...

the new IPC ArchSeal*

REQUIRES NO MECHANICAL ASSIST. It floats . . . it's revolutionary . . . it's so simple in design and so reliable in service you'll wonder how you ever got along without it! IPC's custom engineered ArchSeal is just what the name implies . . . an arched design with *flexing* sides.

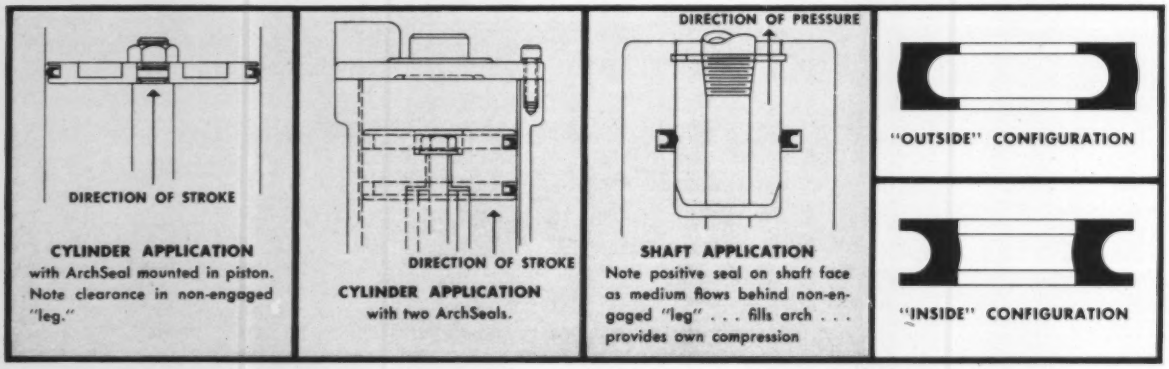
The far "leg" of this new seal moves *away* from the pressure source *instantly* . . . to provide positive sidewall sealing as the air medium flows around the non-contact leg and back-fills the hollow arch. Immediately . . . you get self compression on the *face* of the seal as the air pressure expands the face outward against either shaft or cylinder wall.

That's right! They're made for inside or outside sealing. Reverse the pressure or stroke . . . the seal reacts in the opposite direction with the same positive results!

Reliability? Many are performing perfectly now with over 20,000,000 cycles. Temperature range? From minus 30° up to 500° F.

Here's the *ideal* seal for air cylinders where no lubrication is possible. Here's the way to eliminate expensive assembly components of O-rings, U's or V's with their expanders, back-up rings, or washers. You don't need them! The ArchSeal solves the problem without extra frills.

Oh yes . . . it's an IPC "custom" product so we'll need details on your application. Don't hold back . . . the ArchSeal can be the answer for which you have been looking.


DIRECTION OF STROKE
CYLINDER APPLICATION
with ArchSeal mounted in piston. Note clearance in non-engaged "leg."
DIRECTION OF STROKE
CYLINDER APPLICATION
with two ArchSeals.
DIRECTION OF PRESSURE
SHAFT APPLICATION
Note positive seal on shaft face as medium flows behind non-engaged "leg" . . . fills arch . . . provides own compression
"OUTSIDE" CONFIGURATION
"INSIDE" CONFIGURATION

IPC

OIL SEALS
PACKINGS
PRECISION MOLDING *Custom designed for your application*

INTERNATIONAL PACKINGS CORPORATION

Bristol, New Hampshire

*Patents and Trademark applied for.

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P6

Technical Outlook

ELECTRON BEAM PROGRESS—A recent Navy invitation to bid turned up 63 firms that wanted to quote on an electron beam welder. Even though most were ruled out as not qualified, the response indicates the extent interest has increased in the new technique.

CASTS DUCTILE MOLYBDENUM—An ultrapure ingot of molybdenum produced by Oregon Metallurgical Corp., Albany, Oreg., has room temperature ductility in the as-cast condition, reports Battelle Memorial Institute, Columbus, Ohio. Analysis: Less than 20 ppm carbon, oxygen, nitrogen, and less than 50 ppm sulfur. Reduction in area is reported to be 3.2 per cent.

RADAR DATA SPEEDED—Raytheon of Canada Ltd. says it has developed an economically feasible method of relaying radar pictures via telephone lines. Result: Multiple displays of such information at widely scattered points.

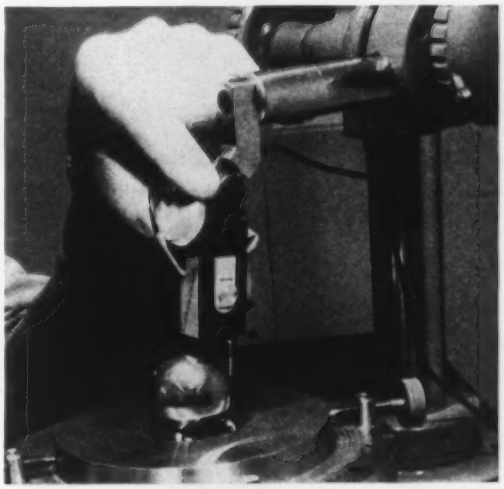
MOTOR EFFICIENCY BOOSTED—Pressure molded ferromagnetic powders may soon replace wound copper wire coils in many types of electrical motors. Example: Those employed for auto windshield wipers. Several firms are doing similar research, investigators report.

FOILS AID STAINLESS STUDY—Reactions of precipitation hardening, stainless steels during heat treatment are more easily determined if you employ foils, states the National Bureau of Standards, Washington. Tests indicate that hydraulic bulging of a disc of foil gives satisfactory data on yield strength and ductility. Specimens are easily prepared, little material is needed, and edge effects are no problem. You can get further details in AST&M Materials Research Standard 1, 471, 1961 (David B. Ballard).

VACUUM INSULATION—A new pipe for cryogenic fluids is insulated with alternating layers of aluminum foil and glass fiber enclosed in an evacuated, stainless steel envelope. Pipe extends beyond the insulation at each end so lengths can be welded in the field (joints are insulated with a special sleeve). Compared with standard lines, the superior thermal efficiency of the new pipe cuts leaks, minimizes pressure drop, and reduces evaporation losses, claims Linde Co., a division of Union Carbide Corp., New York.

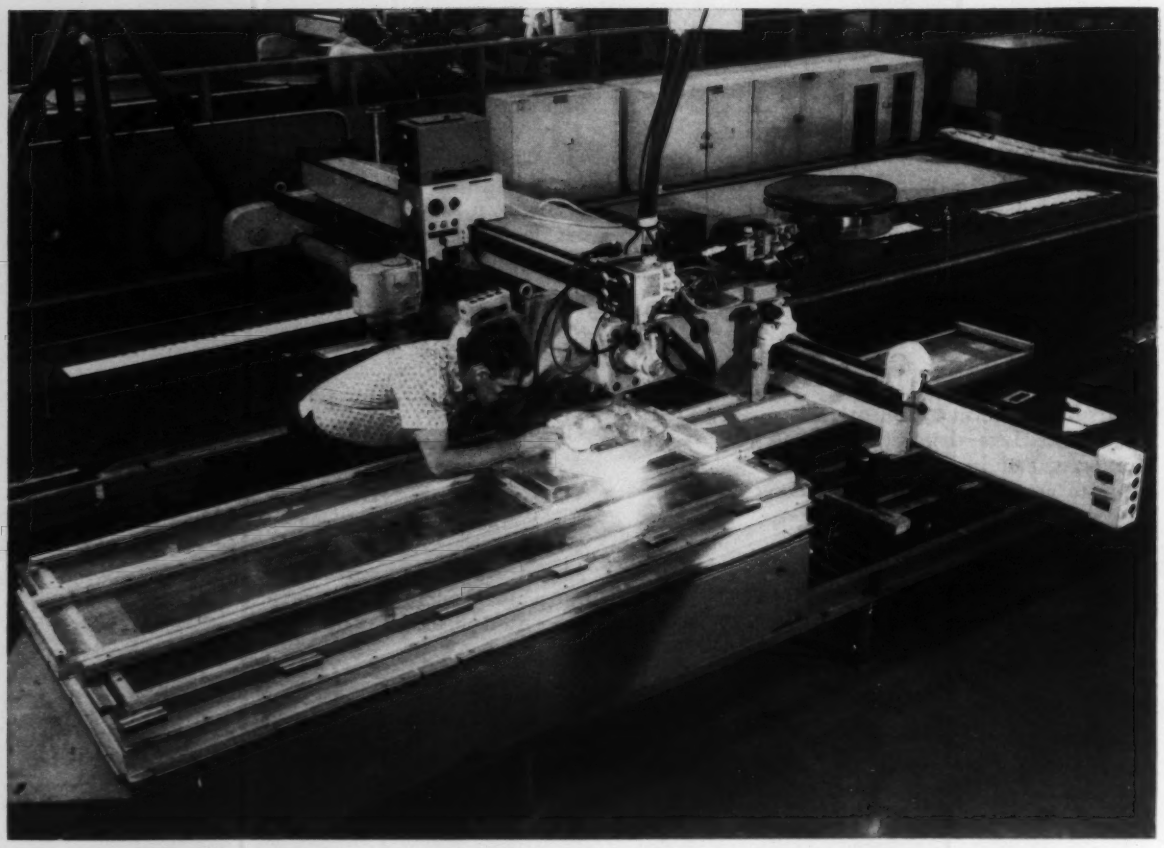
TOUGH PLASTIC LINER—A two step method of applying resin to pipe interiors produces a bond so tough that either metal or plastic must be destroyed to separate them. Total cost is less than 15 cents a square foot, says Engelhard Hanovia Inc., Newark, N. J.

TOO MUCH MATH?—Too many research people try to solve problems with mathematics and theory alone, claims Dr. Max M. Frocht, Illinois Institute of Technology, Chicago. Needed: A combination of experimental (empirical) and theoretical methods.

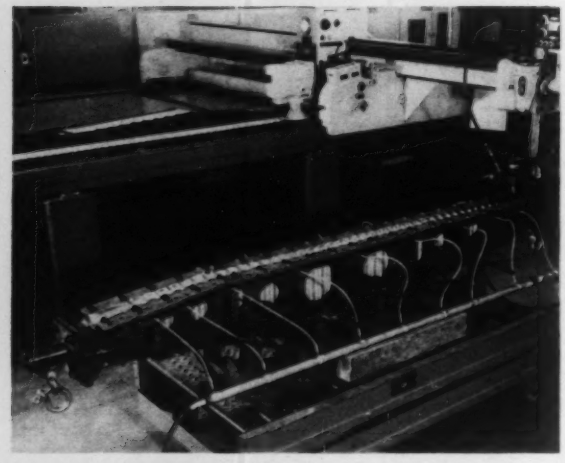


IMPROVED GUIDANCE GYRO depends on a hollow beryllium sphere electrically suspended in a vacuum. Once started it spins for years. The angular position of the rotor can be determined visually. Optics, electronics, vacuum pumps—the works—fit in a 3.5 in. cylinder that's 4.75 in. long. Less than 4 watts are needed to operate the device.

Solved: Some of Tomorrow's



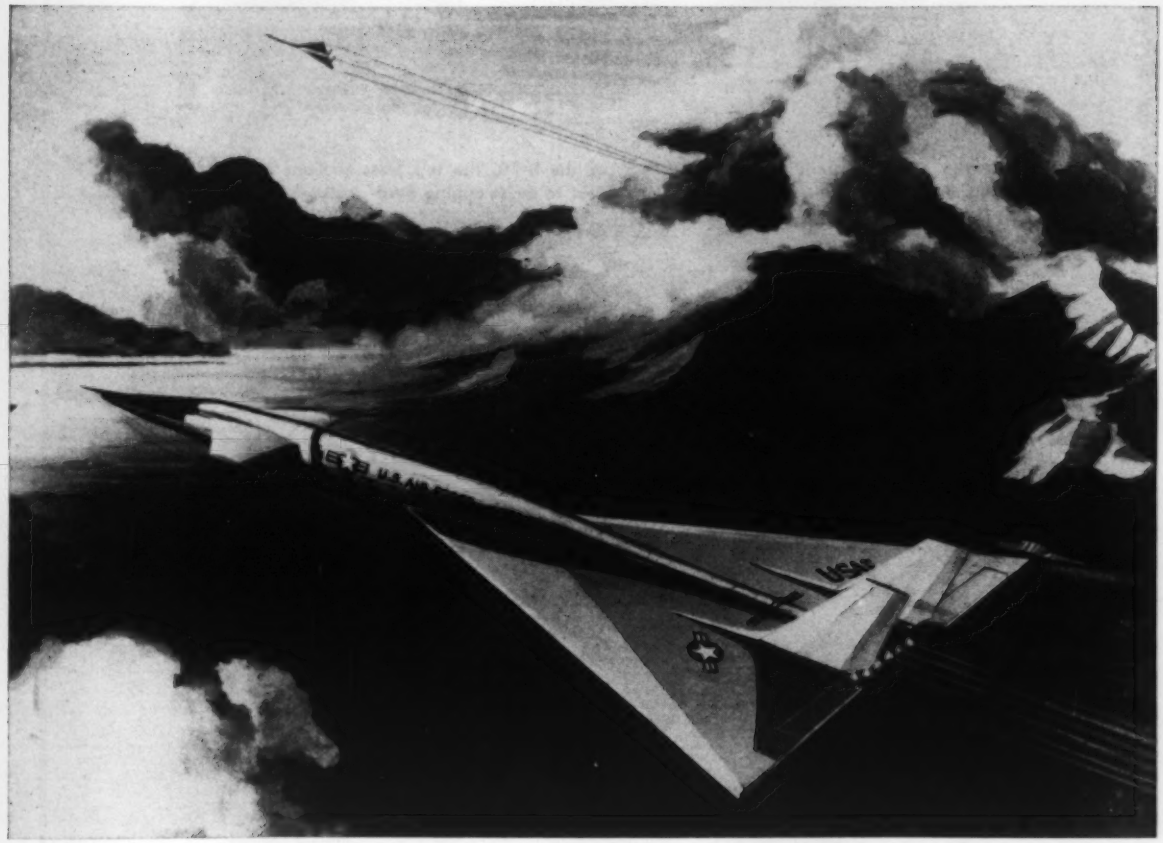
The "burn-through" technique developed at North American for sine wave shaped webs employs this modified flame cutting machine fitted with a Tig welding head



Here's a typical fixture complete with chill bars which holds the wavy shaped webs in the inert gas chamber

The beams are typical of the 148 employed throughout the B-70. Dimensions: 8 to 98 in. long

B-70 Welding Problems



• **"STRONG as a bridge, precise as a watch," the Valkyrie builders' motto, accurately describes the standards being met by B-70 welding techniques, says North American Aviation Inc., Los Angeles. It's joining such advanced alloys as Rene 41; H-11; 6-Al, 4-V titanium, and Armco PH 15-7 Mo, which retain their structural strength well above 1000° F.**

Significant in North American's success in turning out more than 8000 ft of high quality welds per B-70:

• The tungsten, inert gas shielded (Tig) method is the backbone of the joining processes employed. (Augmented by electron beam.)

• Its premiums are based on precise control, fixtures built like machine tools, and careful planning to counteract distortion and shrinkage effects.

• A novel approach called "burn-through" welding makes the construction of I-beams with corrugated webs as easy as those with plain ones.

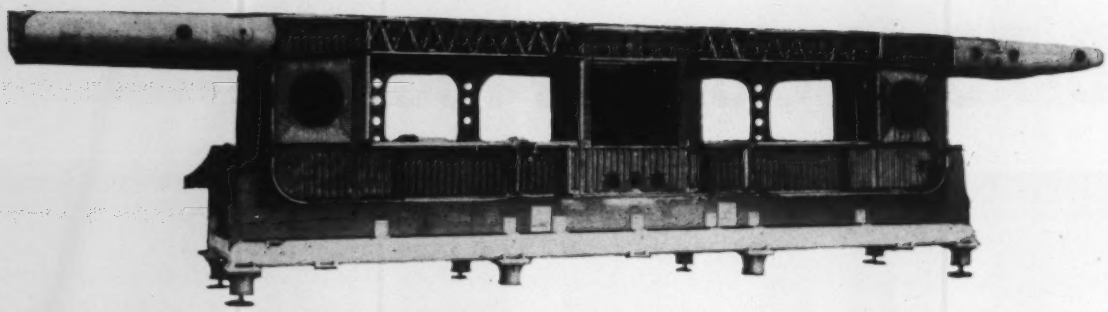
• A novel method of adding filler metal to Tig welds in an atmosphere chamber employs a granular material (called Sectionite) instead of a wire. (It's made from chopped filler metal prepared in the shop.)

• **A special manufacturing development group worked out fabrication techniques. It had to consider subsequent heat treatments, growth factors, inert gas backup, atmosphere chambers, and clamping devices to cut distortion.**

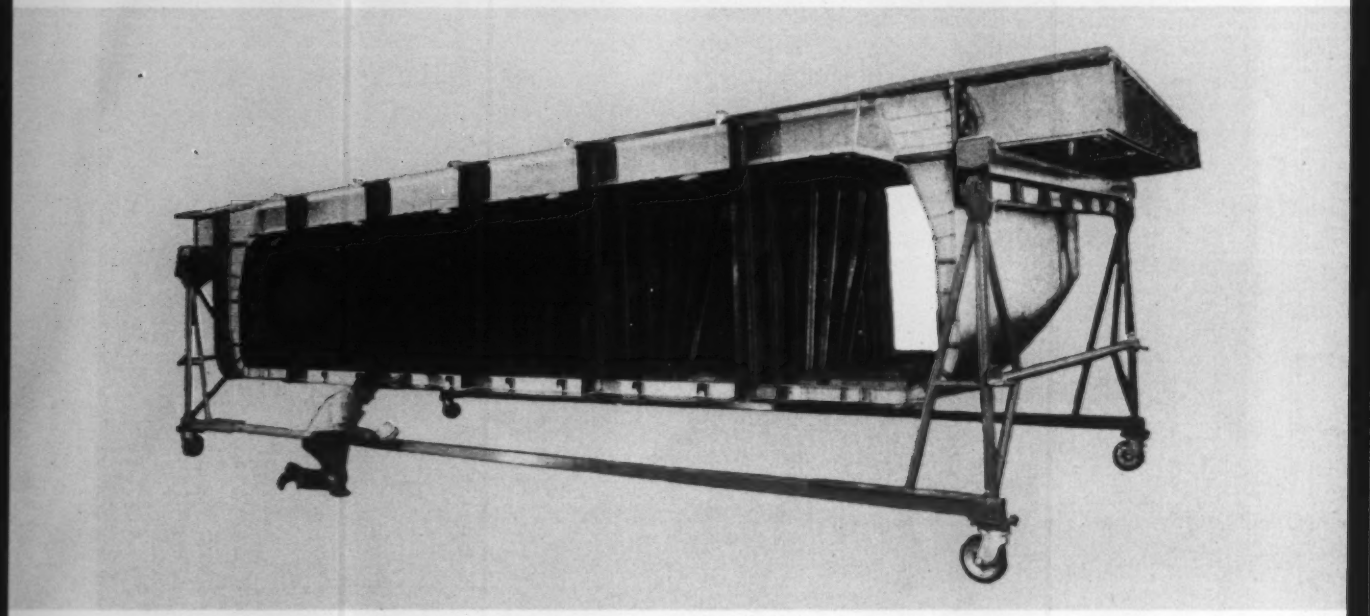
The I-beams employed in the B-70 are made by welding the webs to the caps by "burning-through" the caps. Those with a straight web are made on a conventional stakewelder with a semiautomatic Tig head.

The B-70 has 148 sine wave beams 8 to 98 in. long. The North American burn-through technique (also see STEEL, May 22, p. 116) relies on an electric eye tracing device (Messer Photoscope) which is ordinarily employed for flame cutting. A Tig torch replaces the cutting head. Templates are located several feet from the welding end.

Tooling is fairly precise to pro-



In the aft, intermediate fuselage section of the B-70, the top truss sections (triangular shaped members) are made of H-11 tool steel to resist engine heat



Engine dividers in the aft fuselage section are made of Rene 41. Tooling has copper chill bars to limit the heat affected zones

vide maximum chilling and securing of weldment details. In addition, all surface obstructions are eliminated to provide the best possible welding clearance. Data gathered from tests show how to build holding fixtures with the best backup groove depth and width for the materials employed.

• A rotating welding head has been designed to follow changes in direction of sine wave weldments.

The device can be rotated manually to follow the head as it moves along the wave pattern. (An improved design on the drawing board will make following even simpler.)

The solution to titanium welding problems followed closely those of stainless, except that a separate set of dimensional standards had to be worked out for chill bar spacing and backup grooves.

A plastic tent served as a chamber to hold inert gas, but it was replaced by a chamber with a sliding plastic cover which permitted better visual inspection.

• Chamberwelding created a problem: How to add filler metal. North American came up with Sectionite, which is granulated filler wire.

Granular filler is mechanically added along straight welds, but for sine waves welds, it has to be done manually—the time involved is said to be negligible.

Sectionite becomes active during welding and contaminates the tungsten electrode. Continual replacement meant breaking the seals of the gas chamber plus a lot of lost production time.

A ceramic nozzle solved the problem. Unlike the simple Pyrex nozzle first employed, it has a 60 degree taper which faces away from the Sectionite placement ahead of the electrode and reduces pickup. The nozzle also clears the chill bars much better, technicians report. (The electrode protrudes 3/32 in. from the nozzle.)

• H-11 alloy steel has the properties needed for landing gear fittings, tubular truss assemblies, longerons, and other highly stressed weldments

Shrouds for the jet engines which fit inside aft section (left) are also made of Rene 41. They contain both Tig and resistance spotwelds, says North American

that must withstand heat.

Problem: How to weld H-11 without cracking.

Solution: Heat to 600° F, weld, stress relieve at 1200° F for 3 hours and cool.

North American keeps the H-11 parts under 750° F to cut the scale formation. If welds penetrate through the material, argon backup protection is arranged.

To keep fixtures and H-11 parts hot, "hot boxes" equipped with electric heating elements are built. After welding, small assemblies are held in a larger furnace until a batch can be stress relieved without removal from the furnace. Some of the larger hot boxes also take care of the stress relieving cycle without benefit of furnace.

Four recording devices pick up and record weldment temperatures from 15 locations in the hot boxes.

North American developed aluminized asbestos clothing (see cover) cooled with piped-in air to protect operators who have to lean over such heat. Although the clothing is bulky, operators are able to adjust their techniques to turn out high quality welds.

Weld tools function both as jigs and stress relieving fixtures. Details are assembled to gain a maximum number of welding cycles and stress relieving operations without unloading.

• The aft sections of the B-70 engine shrouds and dividers are made of Rene 41. Both Tig arc spotwelding and resistance spotwelding are employed on assemblies, North American reports.

Tooling for the material has to include chilling provisions for the weld zone. Water cooled copper bars are good enough, says North American. Backup bars provide shielding.

The company advises: Exceptional care must be taken to obtain tight fitups. Otherwise, you get erratic weld shrink patterns. Sequences are designed to cut built-in weld stresses.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Operators often retain control

Automation May Boost Use Of Tubular, Split Rivets

• INCREASED automation of manufacturing processes is increasing the popularity of riveting, says the Tubular & Split Rivet Council, New York. One reason: The fasteners are adaptable to assembly in small shops, or in larger, more mechanized plants.

Optimum application techniques vary from one plant to another—from relatively simple mechanization to full automation. How much a given fastening job should be mechanized or automated can be decided only after careful analysis of several factors, including production rates, costs, engineering talent available, and physical features of the plant.

• Versatility, availability of several sizes and shapes, and effective fastening often favor riveting in the selection of joining methods.

Riveting is an assembly tool that can be used on many product lines, says the council. It is identified with many joint designs, and equipment can be re-tooled to accommodate a broad range of rivet sizes. Example: At Standard Control Div. (Beaver, Pa.) of Westinghouse Electric Corp., production engineers use the method to attach identification plates to cover plates. They also use it to fasten circuit breaker cases and to join dissimilar materials. They can assemble almost any product mix, in variable quantities, without sacrificing efficiency.

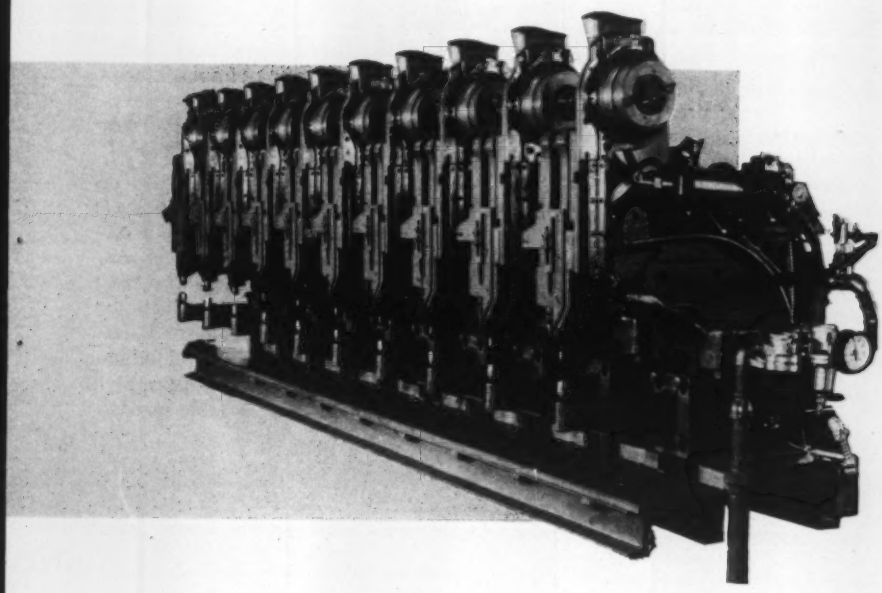
Produced by cold heading, rivets are available in a large number of sizes and shapes. They can be designed to meet unusual physical requirements or to endure severe end use at little extra cost. Result: Considerable freedom in product design.

Joining with rivets is said to be as effective as it is economical. Assemblies can usually be made to precalculated tightness, and visual inspection is adequate in most cases. Appearance meets rigid standards—the rivets are often used for their design function as well as for fastening.

Sigma Instruments Inc., a manufacturer of electromagnetic relays in South Braintree, Mass., is one of many firms that designs products for riveting. The fasteners are said to insure tightness and provide a low cost production assembly method.

• Inexpensive fasteners and efficient setting machinery help hold down over-all assembly costs.

Recognition of in-place cost as the key to fastening economy explains the popularity of rivets in many plants, says T. C. Buchanan, machine sales manager at Milford Rivet & Machine Co., Milford, Conn. The fasteners cost little and can be clinched with modern machines that cycle in milliseconds. Assembly time is governed more by work handling than by the riveting equipment. Automatic feeding of rivets, with efficient machines and



. . . in fast, flexible, partially automated riveting operations

positioning fixtures, makes it possible to increase assembly speed four or five times over that of hand feeding and setting.

Other advantages: Equipment doesn't require a large capital investment. Machines don't become obsolete rapidly; they are easy to maintain; and operators needn't be highly skilled.

• Feasibility should be proved before an automated riveting system is adopted.

The ideal automated assembly station, designed to join metal or other parts, follows a forming and drilling (or punching) sequence, says Douglas Downes, vice president of engineering, Judson L. Thomson Mfg. Co., Waltham, Mass. It includes riveting equipment, with devices that automatically direct parts into the machine, position them, actuate the riveting machine, and reposition parts for further riveting—if it is necessary. The station also includes equipment for unloading assemblies onto a conveyor or into a chute. Means must be provided in such a system for detection of malfunctions and the transmission of warning signals to monitoring units.

But such a system must promise to pay out in a reasonable period—say three years. Feasibility is likely if present production facilities are operated 24 hours a day, five days a week, to handle the workload.

Important condition: Plant facilities should be concentrated on one floor to eliminate the need for control systems with three dimensional transfer capabilities.

• Full automation calls for the integration of controls with other parts of the mechanized system.

Means must be available to transfer work in a prescribed sequence and over a prescribed distance. Work must be inserted—perhaps repositioned—so that rivets are driven and clinched in the required pattern. Automatic inspection, unloading, and retransfer must also be provided. Servomechanisms ordinarily handle those functions on signals from transducers and amplifiers. The mechanisms actuate transfer systems, position workpieces, and cycle the rivet setting machines. They also make it possible to check rivets (for proper clinching) from a remote inspection station.

Such automated systems can be practical even if product design life is uncertain. Design changes can be accommodated with magnetic tapes or punched cards. Variations in material thickness can be compensated for through feedback networks. And changeable riveting patterns can be followed by placing parts on a programed table that can move in two directions.

• Partial automation and mechanization may provide greater fastening flexibility than full automation.

A mechanized system in which certain functions are done automatically can be used in a broader range of applications than a fully automated setup, E. R. Cross, president of Tubular Rivet & Stud Co., Quincy, Mass., points out. Example: A fabricator of television trays attaches clips in a highly mechanized, four machine arrangement. The work fixture, operated by air, handles three sizes of trays. One operator, by indexing a switch, controls the number of rivets clinched per cycle—four or eight—and automatically establishes one of two setting positions for the fixture.

Of the four riveting machines, only one (the right front unit) is stationary. The right rear machine moves front to back through two positions; the left front machine moves left to right through three positions; and the left rear unit moves diagonally front to back and left to right through three positions. Holes in the base plate for dowel pins coincide with the machine position selected. Dual anvils, designed for optional anvil pins, are necessary because rivets in two different lengths must be set.

When the fixture is arranged for the largest tray, the eight anvils clinch two rivets in each of four clips. The selector switch is set for eight rivets. On clips that require only one rivet each, only the required four anvils are retained in the fixture.

Actuation of the start button by the operator causes the hold-down clamp to snap into position; the fixture moves into its first riveting position; and four rivets are set—the entire sequence is automatic. If the selector switch is set for four rivets, the fixture returns to its starting position and the hold-down clamp retracts to permit unloading. But if the switch is set for eight

rivets, the fixture advances to its second position, where four more rivets are set before the tray is unloaded.

• Product diversity may make full automation impractical. Production demands in most plants can be met by automating only the more time consuming operations and putting the others in the hands of efficient operators, advise the authorities.

In such a station, the setting machines feed, drive, and clinch rivets into work that is positioned manually or mechanically. The machines may be operated by air or electricity and installed singly or in multiples. They include feed mechanisms that bring the fasteners from a hopper and through a raceway to the assembly point.

Work placement and machine actuation vary with performance required and capital available. Elementary fixturing that helps the operator position holes under the riveting head is usually adequate. But more intricate fixtures are needed for correct and efficient placement of several parts in their assembled position. Assembly rates in such setups depend largely on the operator's skill in loading work into fixtures and on the complexity of parts.

• Use of more rivets per assembly or increased production demands often call for more complicated production setups.

More sophisticated systems are required when assemblies include a number of riveted parts, or when production demands increase, warns William O. Shineflug, sales manager, Chicago Rivet & Machine Co., Chicago.

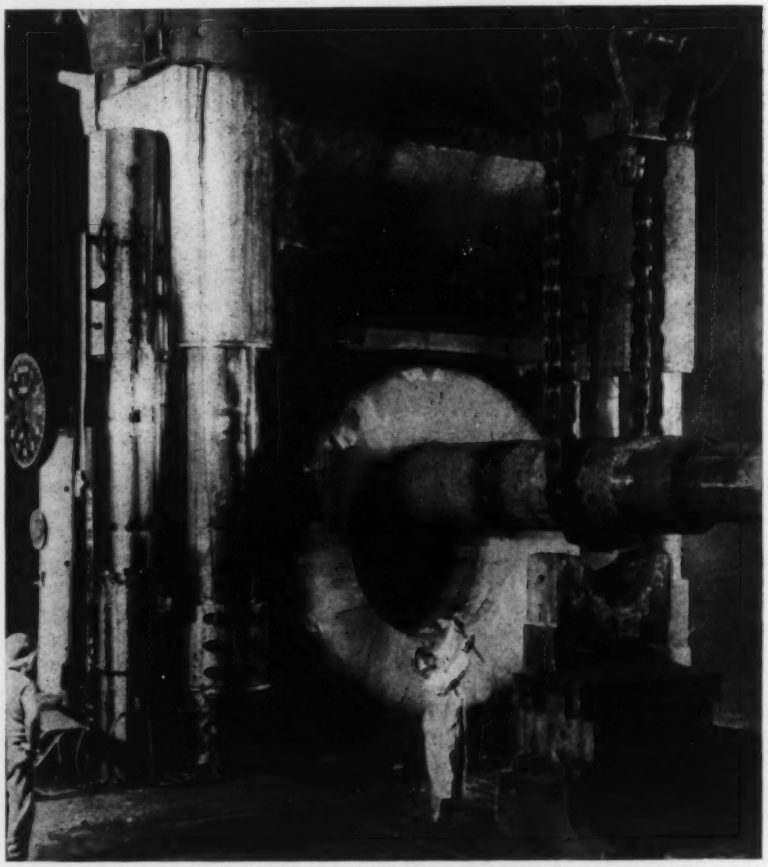
Systems usually include devices for rapid, accurate unloading of parts in a required sequence. The devices also simplify motion by handling some duties ordinarily assigned to the operator, such as actuation of cycle switches.

One device, the sliding table, moves in and out of the riveting machine; parts are unloaded when the table is retracted. Under manual or automatic control, the table slides into position under the rivet head—sometimes closing a circuit to cycle the machine. After retraction, the assembly is unloaded manually or mechanically. Extra fixtures can be used when the assemblies contain several parts, or when loading lags behind riveting.

That type of fixturing is used at I-T-E Circuit Breaker Co., Philadelphia; an automatic positioning cylinder is used instead of manual control. Circuit breaker parts are loaded in a jig on a sliding table, which is in a retracted position. On a given signal, the table is pulled into riveting position by a double acting air cylinder. When the holes and riveting heads are aligned, a switch is tripped automatically, and four, pneumatic setting machines cycle. The table retracts, the assembly is unloaded by hand, and the cycle is repeated.

Clearances, required riveting sequence, or hole patterns may make it necessary to use mobile machines. The machines, mounted on tracks, would move to and from a fixed point in cycles geared to those of the sliding fixture.

In some systems, operators stationed around a rotary table load parts in a prescribed sequence. As each station indexes under the riveting head, it contacts a switch to cycle the setting machine. Parts are loaded manually, but all other functions are automatic. Assembly time is limited only by table speeds.

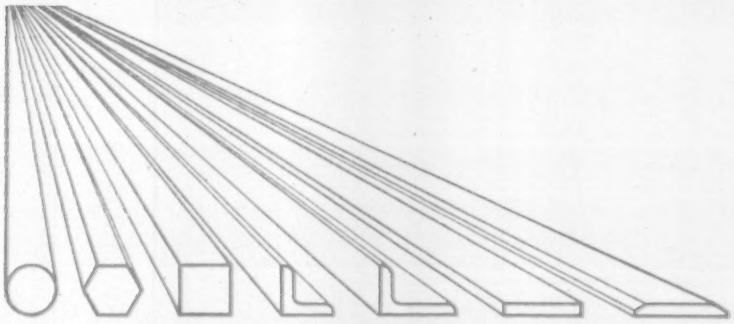


Huge Forging Used in Reactor Addition

THE biggest part of the high powered reactor addition for Shippingport, Pa., started as a 180 ton ingot which trimmed out to an 83½ ton forging (shown). Finished, the nickel-chromium-molybdenum head flange weighs 41 tons. It is 159 in. in diameter, 42.5 in. thick, and 98 in. inside, says the producer, U. S. Steel Corp., Pittsburgh.

THE VERSATILE MILL WITH MARKETS IN MIND

Morgan Designed Mill for Sheffield has ability to Roll Wide Product Variety



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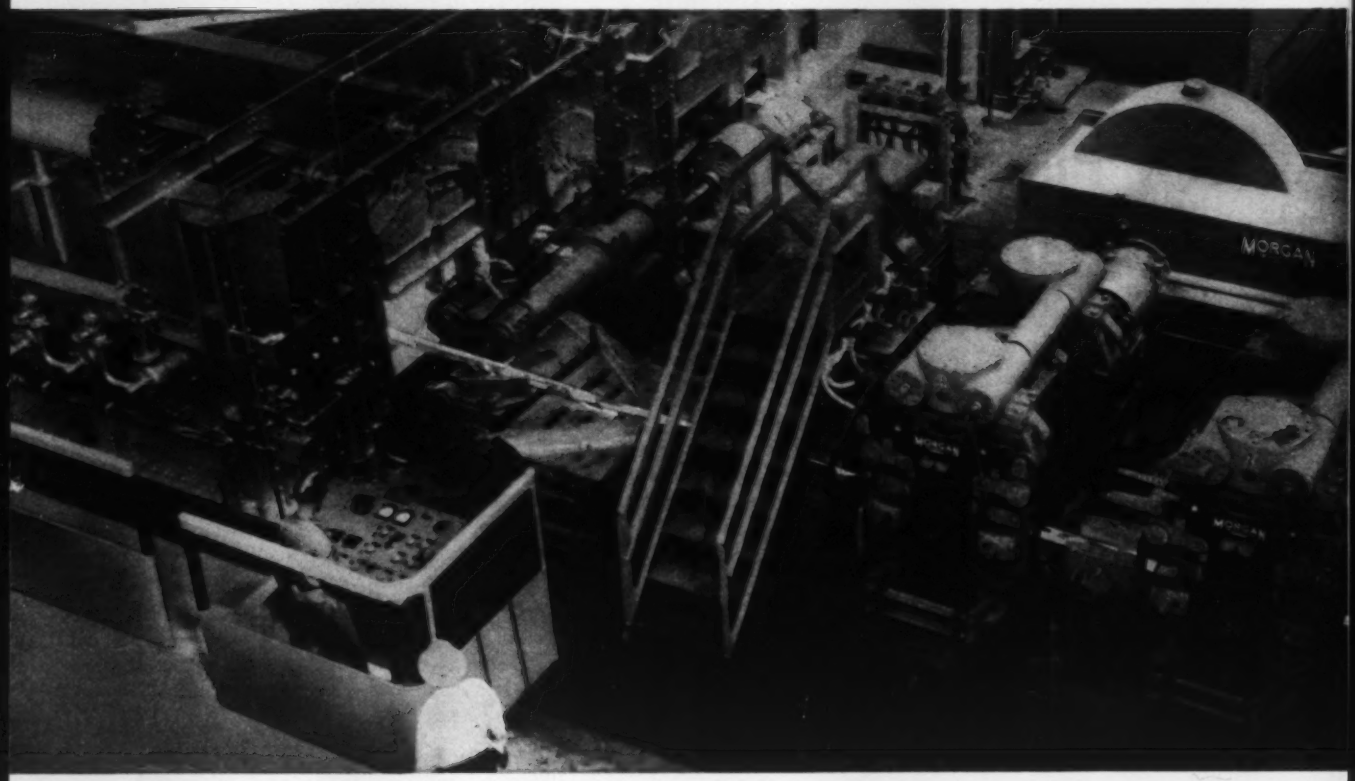
Now rolling at three times previous production rate, the Morgan-built No. 2 rod mill in the Kansas City plant of Armco Steel Corporation's Sheffield Division was designed to turn out with equal efficiency any shape in the broad range of product demanded by current market trends. This example of Morgan creative engineering has gained world-wide recognition as the fastest 10″, 3-strand rod mill—proving again the operating benefits inherent in Morgan know-how and capabilities, accumulated in over 70 years of rolling mill pioneering.



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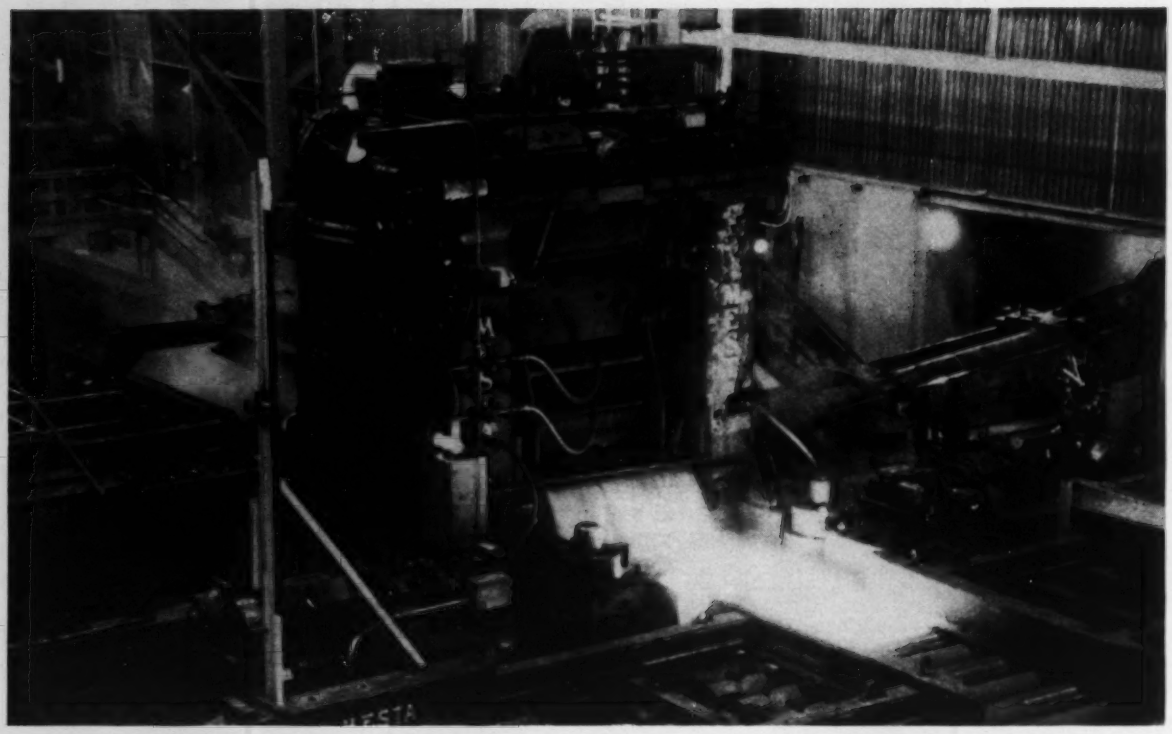

Conduits in mill stand foundations will facilitate changeover to card control

New Plate Mill Adaptable To Programed Operation

• **PROGRAMED operation of major mill components is part of the plans for Alan Wood Steel Co.'s new plate mill at Conshohocken, Pa. (See STEEL, Aug. 28, p. 78.)**

Conduits installed in foundations of the 40 by 96 in., high lift blooming mill and the 110 in. plate mill will facilitate the eventual changeover to card control. For the present, the $36 million facility will be manually operated.

• **Production of larger plates will help the company serve broader markets.**

Plates 3/16 to 4 in. thick and up to 96 in. wide are produced at the new facility. Previously, the company turned out plates 3/16 to 1 in. thick; widths were limited to 72 in. And the mill is capable of rolling alloy steels that could not be rolled on older equipment.

The company anticipates increased sales to steel warehouses, plate fabricators, and shipbuilders because of its broader product line.

Product mix will be altered significantly. About 40 per cent of the company's output will be plates; the balance of production will be evenly divided between hot and cold rolled sheets. Previously, the three products were turned out in equal quantities.

• **The mill boosts plant productivity and promises to increase sales.**

Productivity per manhour has been increased about threefold, says Harleston R. Wood, president.

"We expect the new facility to produce and ship 100 tons of plates with 85 labor manhours," says Mr. Wood. "The old plate mill took 240 manhours to produce and ship 100 tons of plates."

The company hopes to increase its annual sales to about $100 million in the next three years, on the basis of an expected upturn in the plate business. Such a sales pace would require operation at 80 per cent of capacity. (The company's sales for 1960 were about $63 million.)

• **Next expansion: A new hot strip mill or melt shop.**

The company plans to use the new mill as a roughing system for a continuous, hot strip mill—which may be the next expansion project. Such use would require installation of hot finishing stands, coil handling equipment, and additional slab heating capacity.

Alternate plan: Replacement of the company's 140 ton open hearths, which aren't adaptable to oxygen lance operation. The company has not decided on the type equipment it will install, but it will probably adopt the L-D, Stora-Kaldo, or some other pneumatic process.

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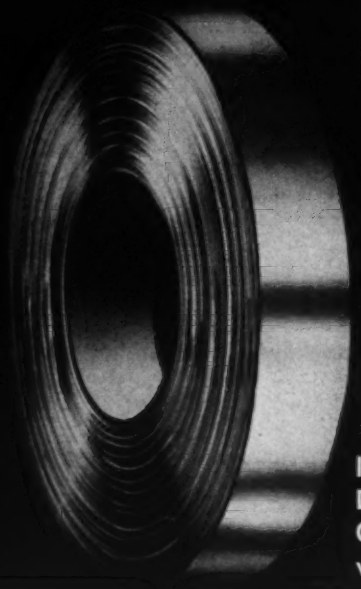

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Builders Charge for Engineering

• A YEAR AGO, a major machine tool builder announced that special engineered proposals would no longer be offered free. A charge of $15 was put into effect.

At that rate, only a fraction of the actual engineering cost is defrayed. The main reason for the charge was stated in the notice Brown & Sharpe Mfg. Co., Providence, R. I., sent to its customers: "We believe this practice will discourage inquiries being sent to us when there is no intention of following our recommendations, as has happened in the past . . . we believe the benefit to our valued customers and to Brown & Sharpe will be the elimination of some nonproductive engineering work which has prevented us from devoting more of our time to inquiries which should be processed more promptly."

• After a year's experience, Brown & Sharpe concludes that its program is working.

Some critics warned about rousing the ire of customers. That has never been a problem. In fact, some customers have opened charge accounts (actually, blanket orders) in which all work is put on the tab, without necessitating purchase orders for each job.

As for the prime goal of the plan, George A. Hawkins, sales director, machine tool division, says: "We have found that the practice has succeeded in sifting out inquiries where there is no intention to buy. It has also resulted in our being able to process new inquiries we receive in approximately one week versus six weeks or longer before we had the plan."

• The plan covers engineering proposals involving cams, tooling, or special attachments for automatic screw machines. It has helped Brown & Sharpe turn a far greater percentage of the proposals into orders.

The company checked the dollar volume of engineered proposals made from March through September, 1960, when proposals were free. The volume of proposals was three times what it was in the same period this year. As for orders, the volume in those seven months this year jumped nearly 300 per cent over the year ago level.

In 1960, orders totaled about 7 per cent of the volume of proposals. In 1961, the batting average was 70 per cent. Naturally, the orders in that period are not necessarily from quotes in the same months. The figures do show, though, that the number of quotes can be trimmed to permit more time to be spent on the right jobs, that the trimming of quotes does not hurt sales, and that customers are willing to pay for the special engineering.

Charge for Changes

Another builder of standard machine tools, National Acme Co., Cleveland, is billing customers for some normal engineering work.

The company felt it was advisable to bill customers for changes that were made after the engineering work was underway.

Last May, National Acme announced it would charge $5.50 for each hour spent on engineering work that . . . because of customer's request for changes . . . does not become part of the final proposal or order.

As with Brown & Sharpe, the National Acme price does not cover the cost of engineering, but it curtails requests for changes based on customer whims.

Huge Tank Cars Haul Liquid Hydrogen

TANK CARS that can haul more than 28,000 gallons of liquid hydrogen per load are being used for coast-to-coast shipments by Linde Co., a division of Union Carbide Corp., New York. The cars will carry hydrogen to West Coast rocket development centers from the government's West Palm Beach (Fla.) production facility until a 26 ton-per-day plant is put into operation at Ontario, Calif., in 1962.

The ultracold cargo (temperature, −423° F) is protected by double walls and superinsulation; evaporation loss is held to about 0.3 per cent per day. Outer shells and underframes for the cars were built at Sharon, Pa., by General American Transportation Corp. Inner tank construction, insulation, final assembly, and leak testing were done at Linde's plant in Tonawanda, N. Y.

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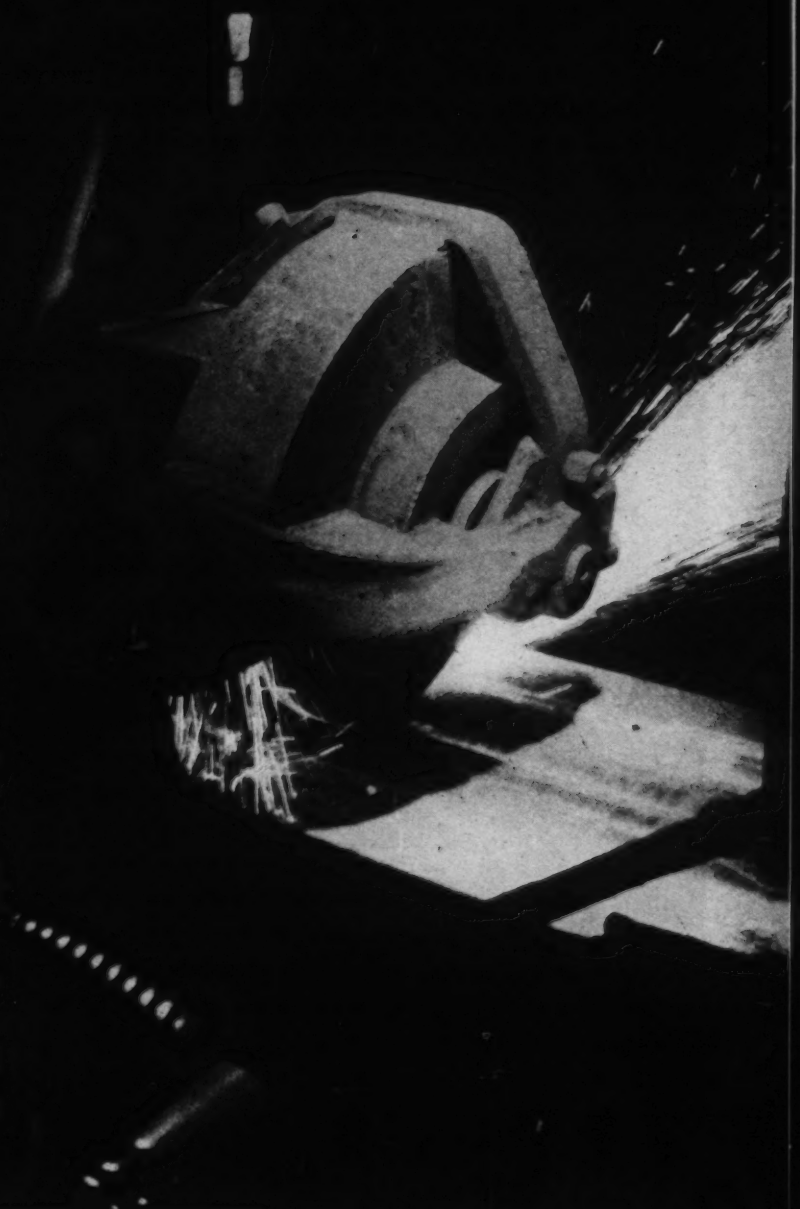

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USS Higher strength steels make more sense for this rugged, light-weight trailer

(It carries 1100 pounds more)

Here is a high-capacity dump body trailer that gives you a substantial dead weight reduction for only a few cents per pound of payload increase!

This trailer, which went into service in January, 1961, hauling both hot and cold slag, is proof that each pound of payload increase you buy can cost as little as 35¢ per pound.

To prove our point, this 27-cubic-yard trailer was created by the TEC Division of the Heil Company, Cleveland, Ohio, in conjunction with the Applied Research Laboratory of United States Steel. Using the USS Family of Steels—carbon steel, USS COR-TEN High-Strength Low-Alloy Steel (50,000 psi minimum yield point) and USS "T-1" Constructional Alloy Steel (100,000 psi minimum yield strength)—compared to a similar capacity carbon steel trailer, we were able to reduce the weight of this one by 1100 pounds—at a cost of only *35¢ for each one of the 1100 pounds.*

This was done by using 14-gage USS COR-TEN Steel for trailer body sides, 12-gage in the floor, and USS "T-1" Steel in the high-strength, lighter weight draft arms.

As a bonus, both USS COR-TEN and "T-1" Steels give you four to six times the atmospheric corrosion resistance of carbon steel. You also get high resistance to abrasion and impact. USS COR-TEN holds paints considerably longer than ordinary carbon steel.

In other words, pound for pound, higher strength steels have yet to be equalled by any other material of construction when you consider strength, endurance and cost.

The tremendous success of this model has led to the design of a similar steel trailer that will lop off still another 400 pounds of dead weight (9100 lbs. tare). For more information about USS "T-1" Constructional Alloy or our various grades of high strength steels, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. USS, COR-TEN and "T-1" are registered trademarks.

United States Steel Corporation
Columbia-Geneva Steel Division · National Tube Division · Tennessee Coal and Iron Division · United States Steel Supply Division · United States Steel Export Company

This mark tells you a product is made of modern, dependable Steel.

This new frameless steel trailer built with USS COR-TEN and "T-1" Steels easily withstood a punishing seven-month service test hauling 23,000 tons of hot and cold slag and is ready for several more years of gruelling work. Operator: Hawkins Contracting Company, Pittsburgh, Pennsylvania.

Adaption of cartridge boring with slotted spindle plates and Erector Set type fixtures substantially cuts setup time and tooling costs at Hughes

Re-Usable Tooling Meets Challenge of Short Runs

• PROBLEM: Turning, milling, drilling, and boring about 100 different parts while minimizing capital investment, space requirements, setup time, and tooling costs.

• ONE ANSWER: Re-usable tooling with building block techniques, offers the El Segundo Div., Hughes Aircraft Co.

The company adapted standard, Heald Bore-Matics with cartridges in slotted spindle plates and re-usable Erector Set type fixtures. Typical jobs: Short production runs of aircraft and missile parts.

• In the first year, savings amounted to $81,000. To date, they total $250,000.

First year savings in gages, fixtures, and other tooling came to more than the cost of the machine tools. Actually, say Hughes engineers, the machines were amortized on delivery day.

• Because of fast setup time, the company can schedule 25 parts or less in a production run.

Average setup time on a job is 3 or 4 hours. The maximum on complex jobs is 8 hours. The company estimates it's now able to bore more holes per setup and do it two or three times faster. One job previously requiring 14 days (from setup through production) ran in 6 hours the first time it was put on the modified Bore-Matics.

Hughes uses five, No. 122 machines and one, No. 222 machine equipped with hydraulic cross slides, rotary index fixtures, and cartridge type boring spindles. The cartridge spindles solve the problem of sufficient spindle capacity to bore interrelated holes. Vertical adjustment of the cartridge spindles through slotted plates was devised. (Normally, cartridges are used in spindle plates having multiple holes to take care of several jobs using common co-ordinates.) The vertical slots give unlimited settings in the vertical plane. Operators are confident of getting repeat settings easily.

• When jobs are changed, additional tooling costs are low.

To set up a job, a master with the general configuration of the part to be machined (and with corresponding holes accurately positioned) is placed in the workholding fixture. An electronic indicator attached to the boring spindle zeroes in the holes by adjusting the vertical position of the boring head and the screw stop in the barrel on the cross slide.

In one setup, 16 spindles are required, and as many as 14 spindles in one end of the machine have been operated. The vertical slides eliminate the need for changing plates when they are used with the cross slide.

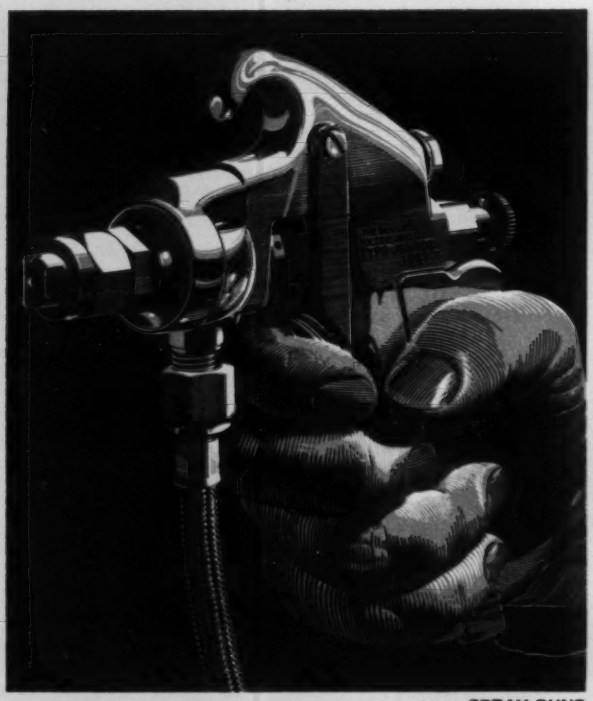
• Hole centers ¾ in. apart are possible.

Speeds and feeds are variable. The regulation of hydraulics, coolant, and room temperatures stabilizes the parts before, during, and after machining. Hughes engineers say the reproduction of boring tool geometry should be done on a generator type machine to duplicate shapes accurately. A Heald, Model 3 tool sharpener is used.

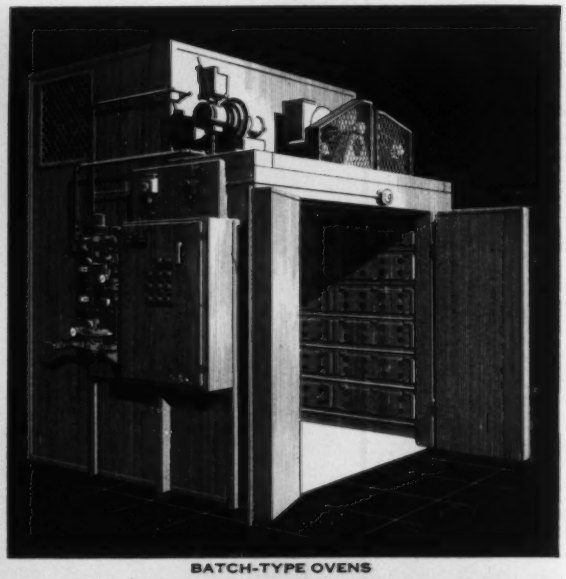
• High hole accuracy is obtained, the company says.

On a map display case, the company must get hole accuracy to 0.0002 in., center distances to ±0.000050 in. with repeatability.

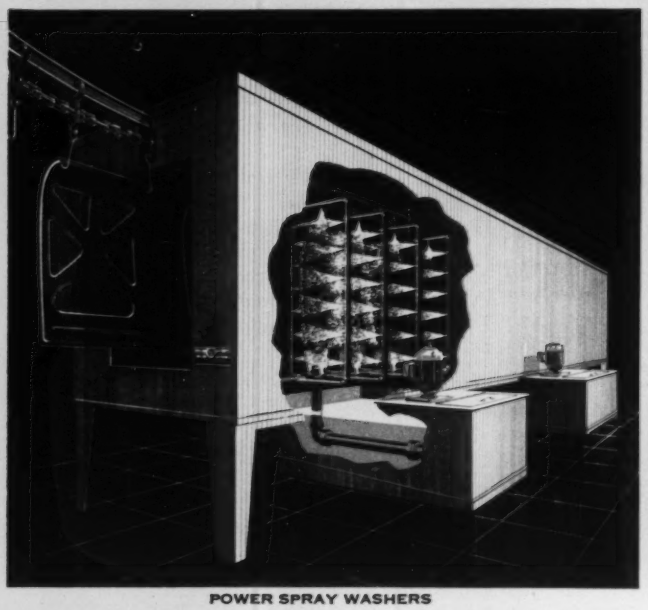
In inspection operations on an optical part of the case, 19 thrust pins must fit snug in slip fit holes. With the Heald setups, Hughes claims it can bore 100 castings and take any of them and slip 19 pins home simultaneously. In this setup, chordal dimensions of ±0.00005 in. and plug of 0.0001 in. under the low limit of hole size are required.



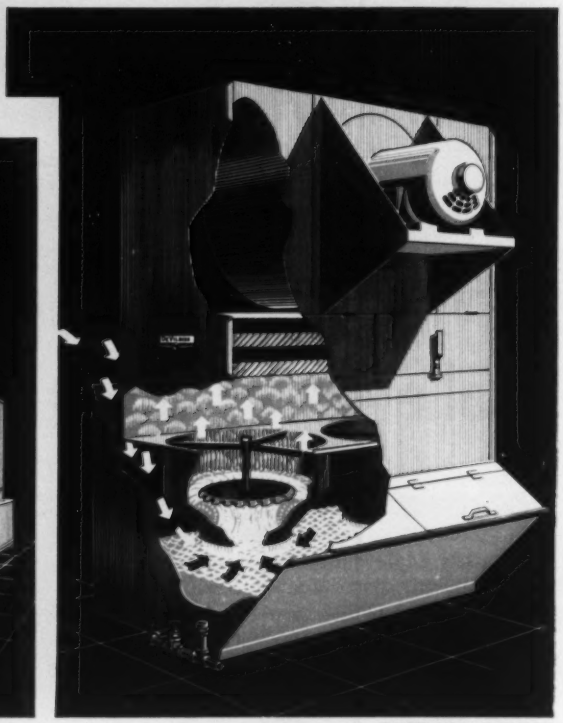
SPRAY GUNS



BATCH-TYPE OVENS



POWER SPRAY WASHERS



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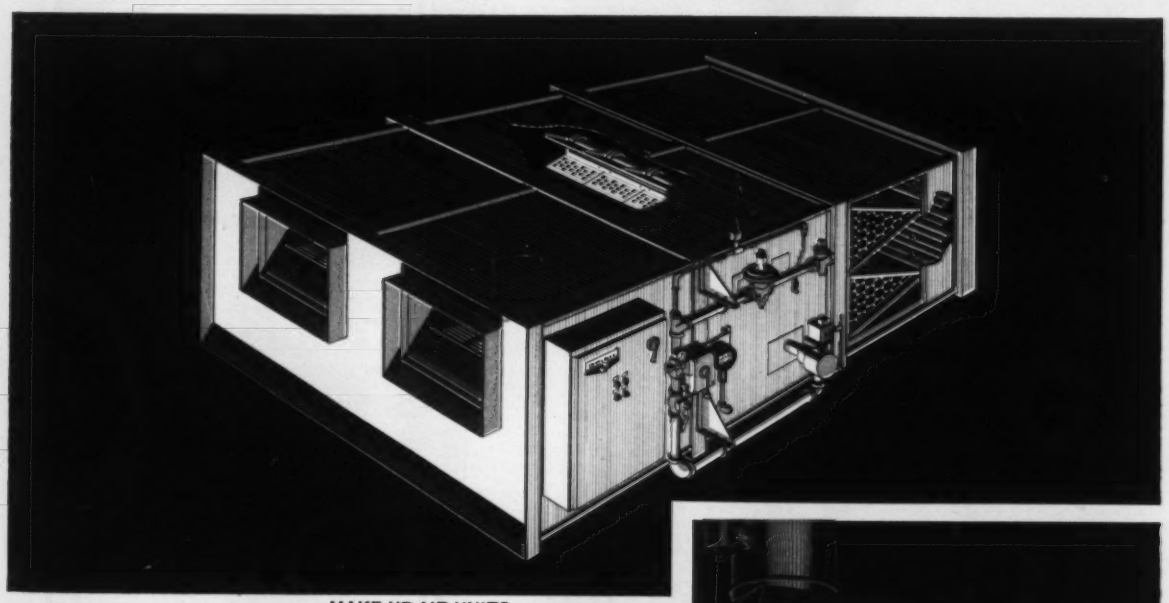
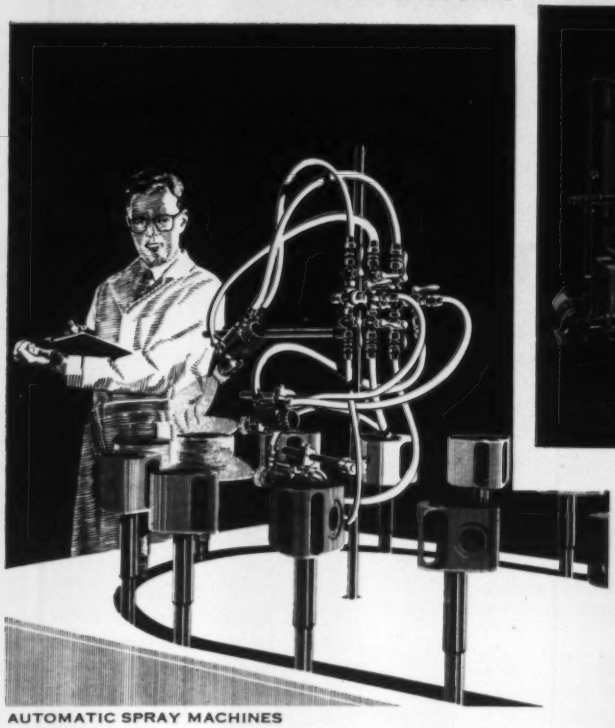


MAKE-UP AIR UNITS

SPRAY BOOTHS



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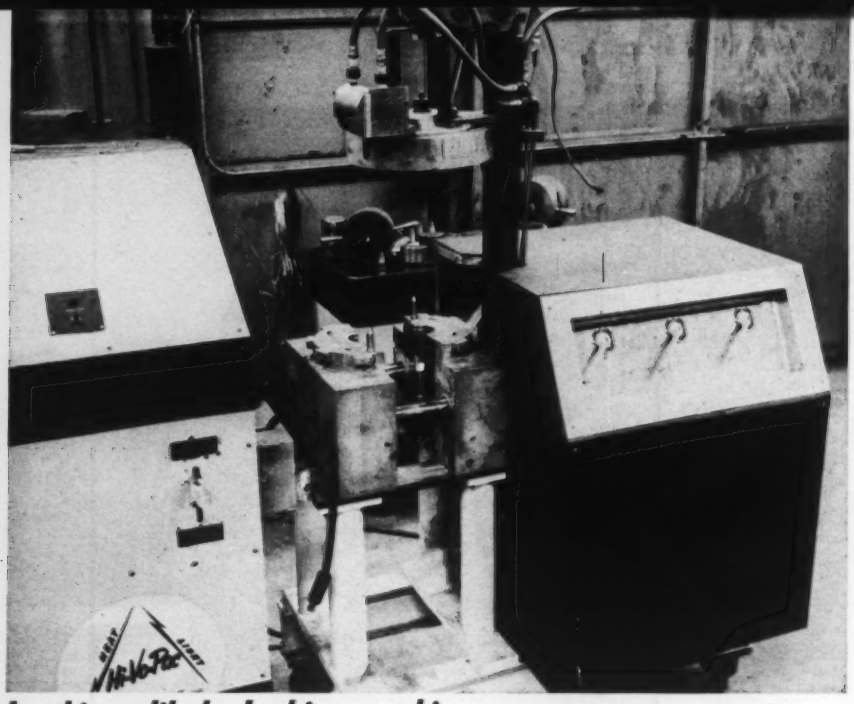


In this unlikely looking machine . . .

Spark Forming Takes Its Place

• POWER from an underwater electrical blast has been harnessed for spark forming production at General Dynamics/Fort Worth, Ft. Worth, Tex. The company calls its process Hivopak. The energy source is a high powered, electrical blast inside enclosed dies.

The impulse that forms the workpiece lasts only about 40 microseconds. Since the voltage can be preset by reading a meter on the console, the method is highly repeatable.

After experimental and practical experience with the process, Fiske Hanley, supervisor, manufacturing research, says: "Its capabilities are particularly attractive when parts have tubular or hollow body shapes. The process lends itself to automation, and if the production runs are short, epoxy or plastic dies can be used for further economies."

• The number of fabrication steps may be reduced as much as two-thirds.

Mr. Hanley says that nearly all conventional and special high strength or high temperature tube and sheet materials can be spark formed.

He feels the process has a good production potential, adding: "The method is not a cure-all, but it should be seriously considered for parts when conventional methods are marginal and scrap rates are excessive.

"The facilities required are relatively small and simple and are easier to operate than more conventional forming equipment." In addition, it will do some jobs normally handled by explosive forming.

Hivopak is being marketed by General Dynamics' Advanced Products Dept., San Diego, Calif.

• Operating at a maximum of 7500 volts, Hivopak will blank, form, or trim—in one operation, or in separate operations. The cost, says the company, is about a penny a shot.

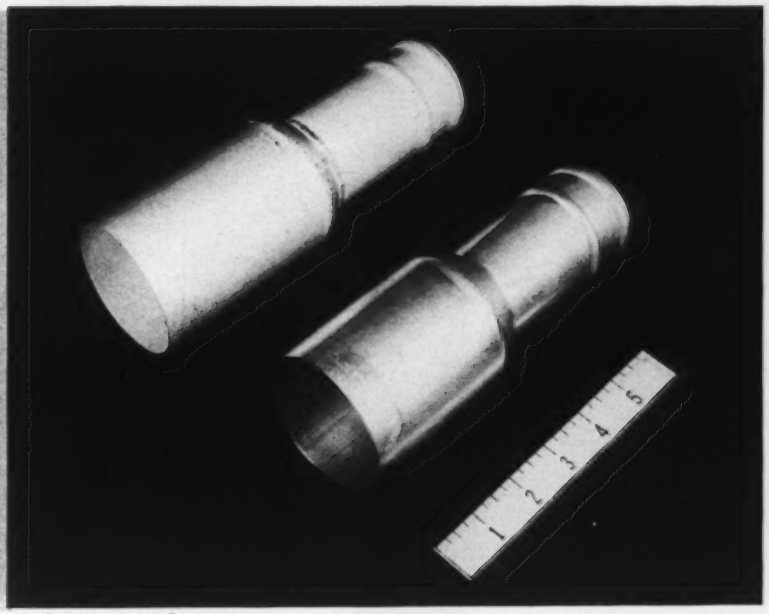
In speaking at seminars sponsored by the American Society of Tool & Manufacturing Engineers, Mr. Hanley has stated: "The equipment can be installed and operated as a factory activity . . . providing easier production than the explosive forming . . .(which is a field operation by nature)."

• Most of the dies are split to permit easy loading of the blanks and unloading of the parts.

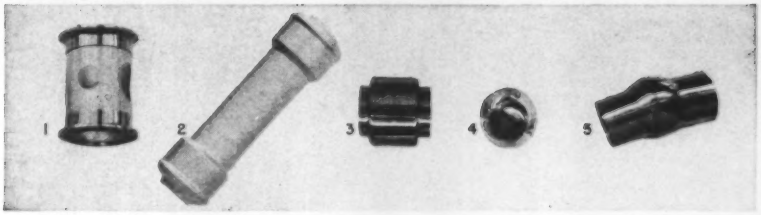
A seal in the bottom of the dieholder contains the tap water that transmits the shock wave from the arc to the workpiece. The part is filled with water, then the cover plate, which includes integral elec-

How Spark Forming Works at General Dynamics

This 321 stainless steel part for the B-58 bomber used to be made by welding three components, as shown at top. Two of the components were roll formed. The job took 31 in. of weld. Then the weld had to be dressed on the large diameter end, and two beads had to be rolled into the part. Now the part is spark formed in one operation. A tube 1 to 3 in. in diameter is expanded to 3½ in. on one end, and the two beads are done at the same time.



Other samples:



1. Internal swaging, tube to collars
2. Tube expansion: 75 per cent diameter increase in 5052 aluminum
3. Tube expansion: 35 per cent diameter increase in 312 stainless
4. Hemisphere drawing: 1½ in. diameter, ⅞ in. deep, 0.032 in. thick, 321 stainless steel
5. Tube bulging to form ball joint assembly in Type 321 stainless steel

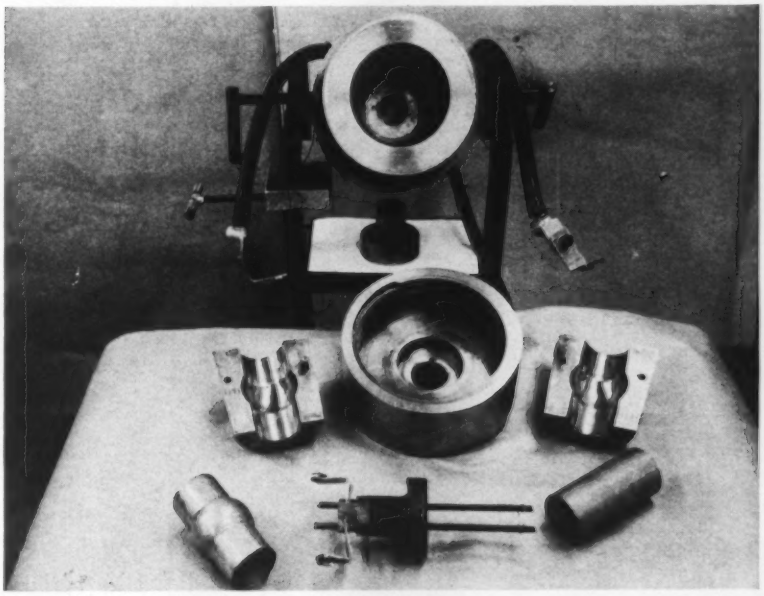
on the Line

trodes and bridge wire, is placed in position.

As soon as the power leads are installed, the operator pushes an activator that builds up the energy in the capacitors of the power supply. The buildup takes less than 30 seconds. When the unit is fully charged, an indicator light flashes on the control panel and the operator presses the firing button to release the energy.

General Dynamics says a plasma is created that forces the water against the inner contours of the die cavity. "The result is a workpiece that exactly conforms to the inside shape of the die."

Since the piece is cold worked, it can be removed from the die by hand. Cycle time, says General Dynamics, depends on the speed and degree of automation, but 2.5 minutes is a "realistic" estimate.

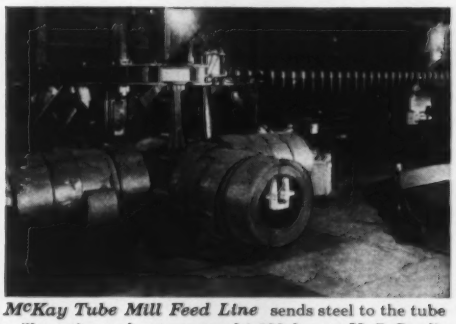


Here's an example of a die assembly, including the die sections, the electrodes with the bridge wire. The blank is shown at right, the part at left

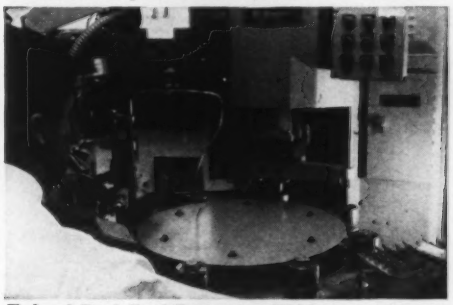
Warco
PRESS

◀ ***Warco Press Line*** composed of three 400-ton straight side, eccentric gear presses forms automobile wheel "spiders" at The Budd Company's Detroit plant. Here, William F. Longfield, manager of press engineering and sales for McKay's Federal-Warco Division, looks over a finished wheel with Edwin Seiberlich, works manager, and R. O. Greenshields, plant manager.

Photo by ARNOLD NEWMAN



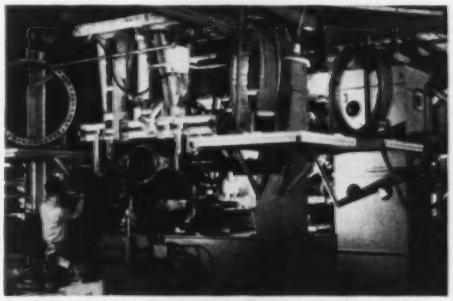
McKay Tube Mill Feed Line sends steel to the tube mill continuously at a rate of 1,800 fpm at U. S. Steel's National Tube plant at Lorain, Ohio.



Federal Dial Feed Projection Welder, one of several used by the Bendix Corporation to weld transistor assemblies. It will weld 2,000 assemblies per hour with exacting precision.

Uncoiling, flexing, processing, slitting, shearing, feeding, forming, stamping, and welding . . . keeping ***metal in motion*** in the most economical manner possible, from coil to finished product, ***is the business of McKay Machine.***

McKay Machine, its divisions and subsidiaries produce the widest range of metal preparation, processing, forming and welding equipment available anywhere. Because of this they can design and build complete, integrated production lines of perfectly mated machinery. This makes it possible to achieve compactness and bring about efficiencies not otherwise practical. It also means the manufacturer is concerned with only a single source of responsibility and supply. That's why more and more cost-conscious metalworking firms are making it a point to know *The McKay Machine Company, Youngstown 1, Ohio.*



Berkeley-Davis Automatic Fusion Welding Lines, such as this one of two recently installed at American Metal Products Company in Detroit for the automatic production of over 200 sizes of motor vehicle axle housings, lead the industry in precision operation, production efficiency, and flexibility.

The trend toward new products, with emphasis on lightness and strength, puts the night lights back to work.

Lots of man-hours are going into these developments, such as thin tin plate and light wall pipe and tubing. We are contributing more than a few ourselves. We should. We are a major supplier of equipment, and what's good for the industries we serve is good for us.

More important, we do have a lot of knowledge and experience to draw on. We have been building equipment for handling and processing sheet and strip, as well as bars, tubes and pipe for a good many years.

300 Sixth Avenue
Pittsburgh 22, Pennsylvania

BLAW-KNOX

Aetna-Standard Division
BLAW-KNOX

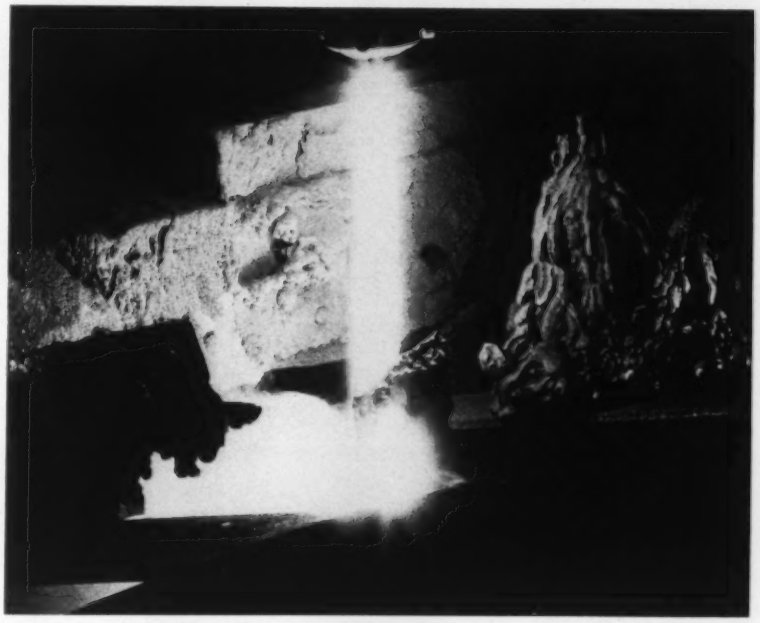
Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes Towers and Special Structures • POWER: Power Plant Specialties and Valves

Design Boosts Heating Potential of Plasma Torches

THE POTENTIAL heating capacity of plasma torches has been increased more than ten times by an innovation in component configuration, says Thermal Dynamics. The configuration permits combining laminar gas flow with the transferring of the arc from torch to work or to a cooled anode outside the torch. Operating at 90 per cent efficiency, the torch produces plasma that's free from contamination and a quiet, nonoscillating flame with an ultrahigh heat transfer rate.

Continuous operation is possible with argon, nitrogen, helium, hydrogen, or any combination of those gases with heat input ranging from 130,000 to 600,000 Btu/lb of plasma gas. Temperatures in that range exceed 60,000° F.

For further information, *write* Thermal Dynamics Corp., Lebanon, N. H.



Drillhead Spindles Have Different Feed Rates

MULTIPLE spindle drillheads having spindles with different feed rates provide versatility.

Such drillheads have been developed by Thriftmaster.

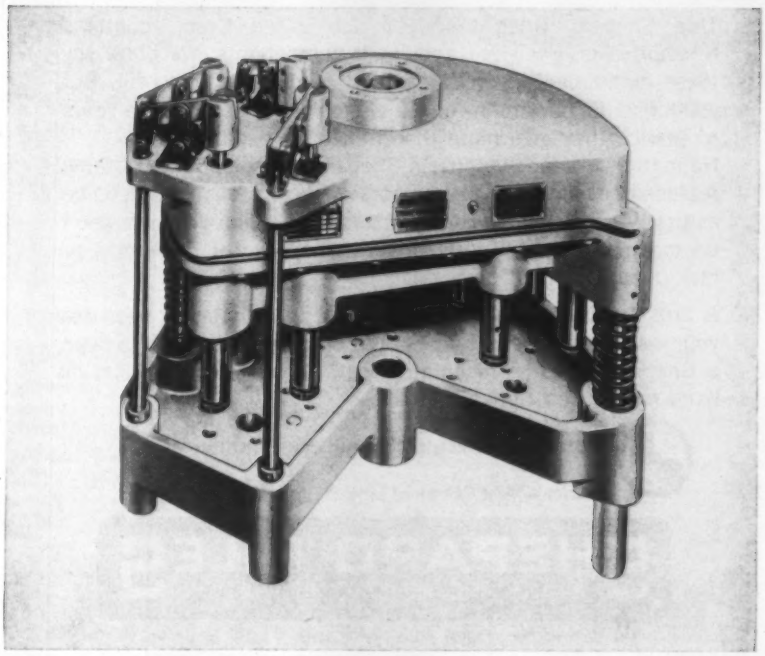
Shown is a 12 spindle, fixed center, drilling and reaming head with the bushing plate designed and built for use with a rotary indexing fixture.

The first operation consists of drilling four holes halfway through the piece.

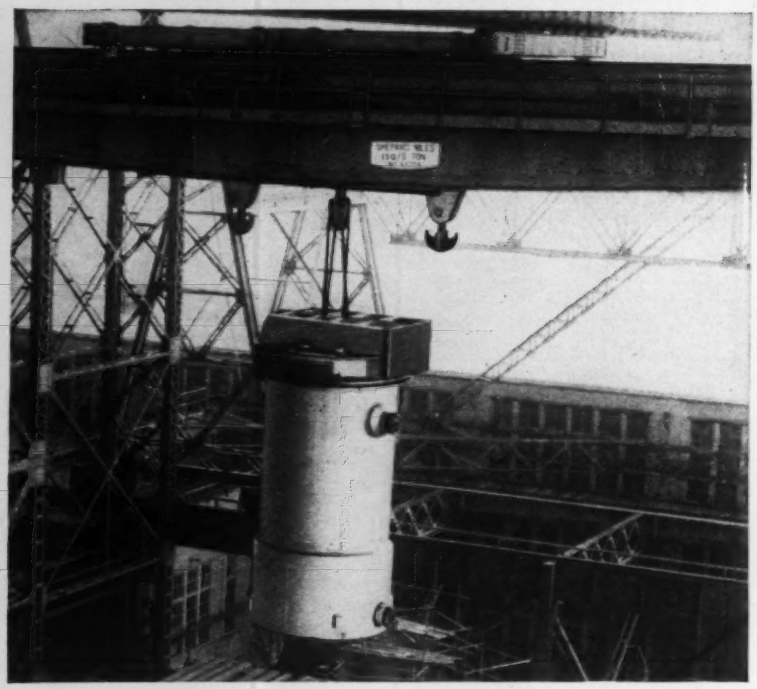
The second operation drills the rest of the way through.

The third operation on the part consists of accelerated reaming through the entire depth of the previously drilled holes.

Movement of the entire head is limited to the distance required for the drilling operations. The four reaming spindles travel twice as far and at twice the feed rate of the drilling spindles. The additional



22-year-old Shepard Niles Job-Mated Crane is as good as new



Installed in 1939, this 150-ton Shepard Niles JOB-MATED Crane, with auxiliary hoist, was used to lower the nuclear reactor into the hold of the world's first atomic-powered freighter, the N.S. Savannah. Reactor was lowered (with only 2 inches to spare at the sides) ¼-inch at a time for the last four inches. (Photo courtesy of New York Shipbuilding Corp., Camden, New Jersey, subsidiary of Merritt-Chapman & Scott Corp.)

This Shepard Niles QUALITY Job-Mated Crane contains Shepard Niles-designed and -built components. We don't say these components won't wear out. Eventually, they will. But you'll find, as have many of our customers, that the extra years of service they give more than offset their initial cost.

No matter how long you use a Shepard Niles Job-Mated Crane, replacement parts are always obtainable. You make the choice as to how many years you want to operate it; the decision won't be made for you by early breakdowns, loss of efficiency, or lack of replacement parts.

A Shepard Niles Job-Mated Crane is just what you need for your load-moving operation. For the complete story, ask to have a Shepard Niles representative call at your convenience, or write for our descriptive bulletin.

Member of Electric Overhead Crane Institute

America's Most Complete Line of Cranes and Hoists

SHEPARD NILES
CRANE AND HOIST CORPORATION

1166 Schuyler Ave., Montour Falls, N.Y.

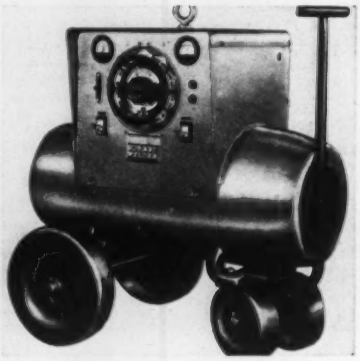
NEW PRODUCTS and equipment

feed is provided by a lever system.

For further information, *write* Thriftmaster Products Corp., 1048 N. Plum St., Lancaster, Pa.

Visor Protects Meters, Controls on Arcwelders

A PROTECTED control panel is a feature on a line of Hobart's dc motor generator arcwelders. All meters and controls are protected by a visor.



All models have multirange, dual control with 10 main ranges of welding current and 100 steps of volt-ampere adjustment in each range. Also included are remote control, polarity switch, and motor start-stop-reset buttons. Meters and portable mountings are optional. Rated at 60 per cent duty cycle, 200, 300, and 400 ampere models are available for 50 or 60 cycle operation.

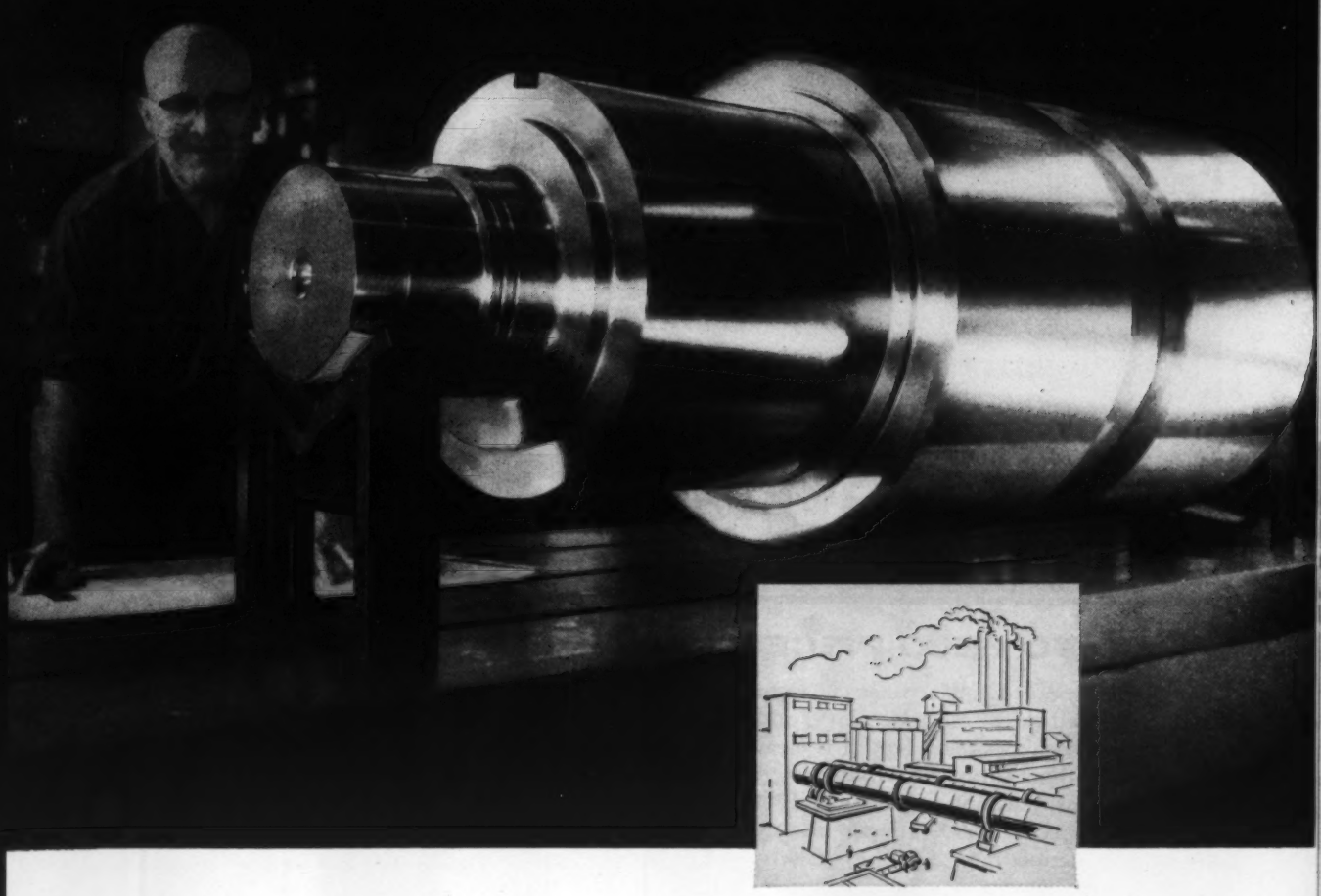
For further information, *write* Hobart Bros. Co., Troy, Ohio.

Machine Checks Plastics For Pressure Forming

PRESSURE formed plastic products can be developed and formability of plastics can easily be determined on the pushbutton controlled, Model P-88 machine.

It's capable of pressure forming 8 x 8 in. plastic samples to a maximum depth of 4 in. at temperatures up to 600° F. Maximum platen stroke is 5 in. Reliable heat and pressure systems, pushbutton con-

Back of a Sack of Cement... This 4½ Ton Steel Forging



Give a thought to this the next time you drive a concrete highway or see a concrete block building. Only 8900 pounds of what it takes to make a sack of cement . . . a relatively small forged steel pinion shaft to drive cement mill machinery.

The large diameter is only 32 inches and the length only 8 feet—but it's a tough, dependable component of a vast manufacturing complex—the cement mill.

The smooth, bright finish is comparable to the gleaming surface of a 60 ton turbine rotor. Why? . . . Because the same careful metallurgical control, skillful engineering and precision production accorded the largest forgings we make are characteristic of this relatively small steel forging.

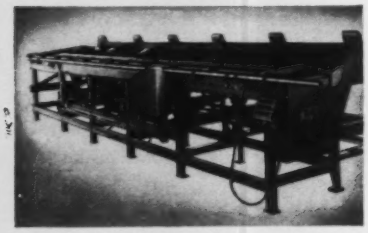
Place with us your simplest or most intricate forged steel components of any size or shape—you will like the results you get.

ERIE FORGE & STEEL CORPORATION

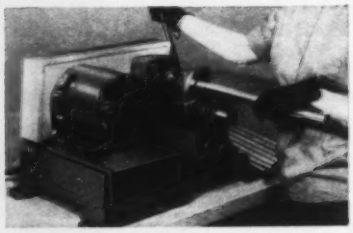
ERIE, PENNSYLVANIA

4500 TO 6500 PIECES PER HOUR

Pines-Grieder Cut-Off Machines cut round tubing up to 4" diameter, with wall thickness up to .250", and will handle rectangular or other tube shapes. Any length is cleanly cut with extreme accuracy . . . dual shear cut eliminates tube-end distortion. Cuts steel, stainless, and non-ferrous metals in 1/3 second cycle time. With feed speeds to 600 ft. per minute, length of piece determines production rate. Tooling quickly and easily changed for various tube sizes. *REQUEST CATALOG 441*



AUTOMATIC LOADER AND FEEDER for Pines-Grieder cut-off equipment. Frees operator by automatically feeding up to 15,000 lbs. of stock in lengths to 22' through the machine. These units are also suitable for feeding other types of equipment.
REQUEST CATALOG 442

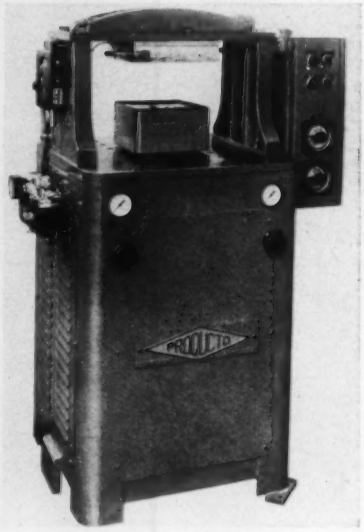


PINES END FINISHING MACHINES simultaneously deburr, chamfer, face, tube, pipe or rod. Handle stock to 5" diameter with high production rates, long life accuracy. Quick, simple tooling and set up. Five models available, manual or automatic, to handle single or double end operations.
REQUEST CATALOG 401

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery
666 WALNUT • AURORA, ILLINOIS

★ NEWS NOTE: GRIEDER INDUSTRIES, INC. HAS BEEN MERGED INTO PINES, PIONEER BUILDERS OF QUALITY BENDING EQUIPMENT.

NEW PRODUCTS and equipment



trol, and semiautomatic cycling help make the machine dependable and efficient. The unit requires 24 x 36 in. of floor space.

For further information, *write* Plastics Machinery Div., Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Conn.

Clad Metal Permits Steel-Aluminum Welding

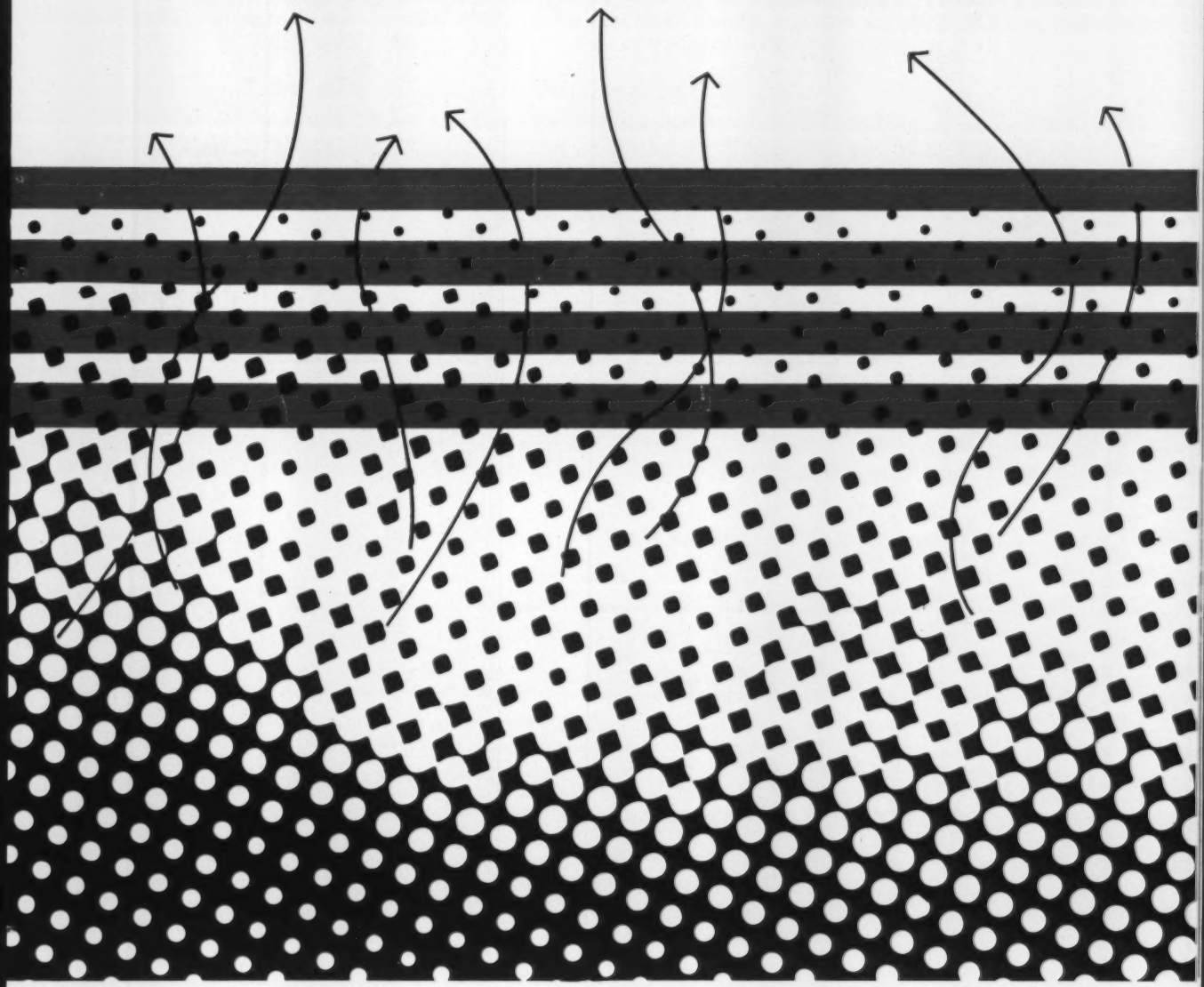
A CLAD metal with aluminum on one side and steel on the other is designed as an intermediate or transition material for joining aluminum and steel parts by welding. Conventional welding methods are adequate, says the company.

The coated electrode process is satisfactory for welding steel to the steel side of the transition material (called Multi-layer). To keep the aluminum portion from melting, easy start, coated electrodes are recommended. For the same reason, the slower welding processes, such as tungsten-arc and oxyacetylene should not be used.

Any of the conventional fusion welding processes can be used to bond the aluminum parts to the aluminum side of the clad metal. The strength of the clad metal bond exceeds the strength of the solid metals, says the company.

Straight lengths or coils of the material are commercially available

AIR POLLUTION CONTROL



Essential consideration today—and KE is a master at it!

The two basic approaches to pollution control are control at the source, and suppression. Typical factors include effluent characteristics, plant process and layout, corrosion control, dust or particulate collection, dust handling. KE services include an independent analysis of your problems, plus complete engineering and installation of a system tailored specifically to your plant and community. KE's experience with all types of control equipment assures you an unbiased selection of equipment, resulting in an effective air pollution control system. A call from you will bring an air pollution specialist to describe what KE has done for others, can do for you. Write for brochure.

7211

KAISER ENGINEERS

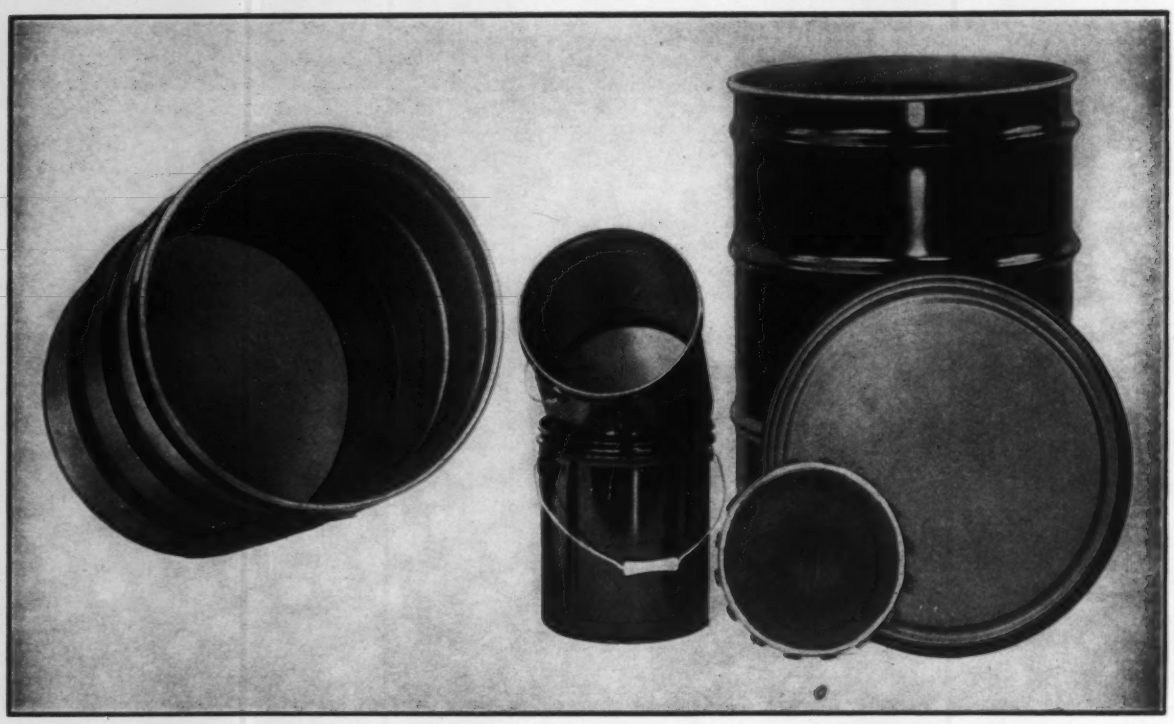
engineers-constructors
Since 1914

Oakland, California—Chicago, New York, Pittsburgh, Washington, D.C., Accra, Buenos Aires, London, Montreal, New Delhi, Sydney, Vancouver, Zurich

HERESITE

Reg. U. S. PAT. OFFICE

PACKAGE AND SHIP YOUR PRODUCTS IN STEEL CONTAINERS—HERESITE LINED



HERESITE PURE PHENOLIC LININGS ARE UNSURPASSED IN RESISTANCE TO PRACTICALLY ALL CHEMICALS, OILS, ACIDS, PAINTS, VARNISHES, LACQUERS, ADHESIVES AND SOLVENTS.

Also declared safe for food by F.&D.A. & Dept. of Agriculture

HERESITE & CHEMICAL COMPANY — MANITOWOC, WIS.
—MAIN PLANT AND OFFICE—

GENERAL COATING, INC. — WOODBRIDGE, N. J.
—EASTERN SUBSIDIARY—

Canada: Dominion Rubber Co., Ltd. — ***Montreal, Quebec***

in widths to 12 in., thicknesses to 0.100 in., and with an aluminum layer up to 50 per cent of the total thickness. Other ratios, widths, and thicknesses will be considered.

For further information, *write* Metals & Controls Inc., a division of Texas Instruments Inc., 34 Forest St., Attleboro, Mass.

Spindle on Radial Drill Moves to Workpiece

RADIAL drill presses developed by Rockwell cut production costs and simplify operations by making it unnecessary to move jigs and other mounting fixtures.

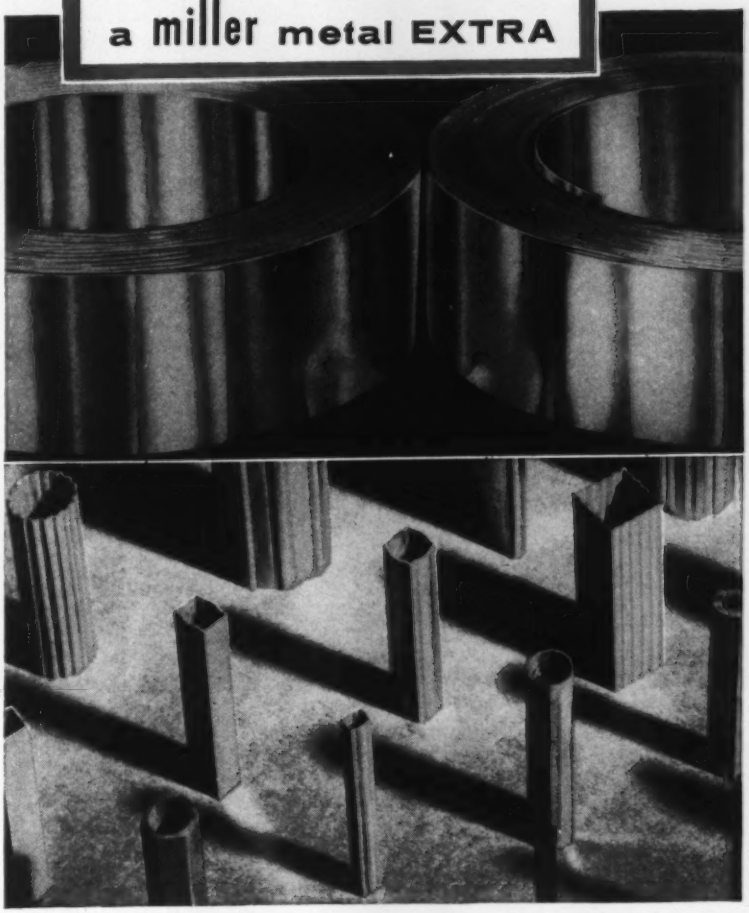
Eight models are available with 4¼ or 6 in. spindle travel and standard (30 in.) or long (42 in.) columns. The spindle can be moved to the work, providing versatility. The drill press head moves in and out through an 18 in. travel radius on a smooth traveling ram that permits drilling to the center of a 62 in. circle.

Head, ram, and cradle swivel 360 degrees around the column to permit drilling anywhere on the table

or on work that must be kept on the floor. The head tilts 45 degrees and locks on both sides to prevent angle deviation under heavy loads. The head can be raised and lowered rapidly. A built-in jackshaft assembly provides 16 full power speeds ranging from 175 to 8200 rpm with a 1725 rpm motor. Attachments can be used.

(*Please turn to Page* 186)

a miller metal EXTRA



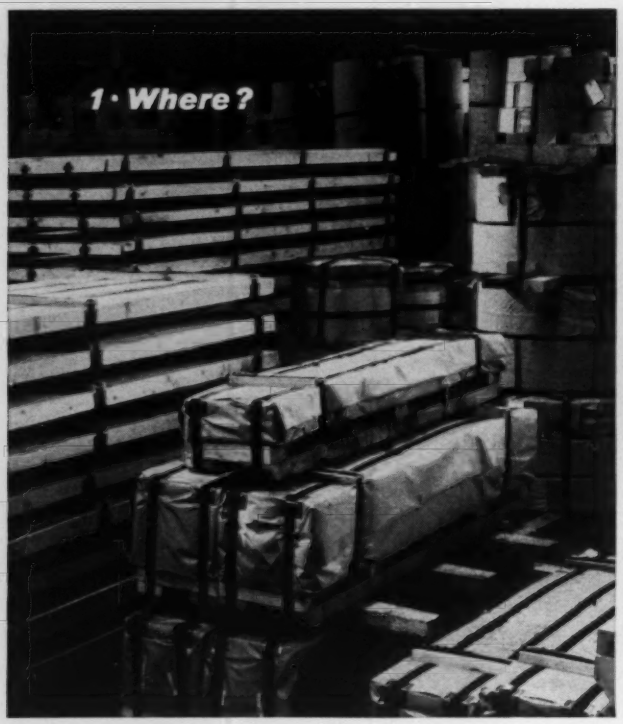
time saving, personal
ONE-SOURCE SERVICE

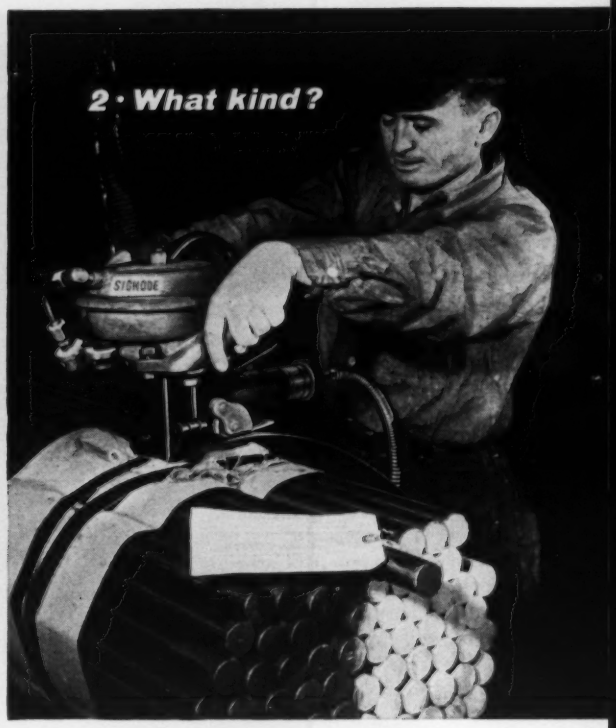
Your Miller sales representative—like all Miller men—offers you one-source service on brass, bronze and nickel-silver strip, and copper and copper-alloy tube in special shapes and sizes. Your Miller man is more than just a shopping center though, he's an expert on special metals and their application. He's backed up by people at the Miller mills who never regard their job as completed until your metal is in your plant, on your machines and satisfactory in every way. For meticulously produced high-grade metal, expert technical help and dependable delivery call on the specialists at Miller . . . where you're a name, not just a number on the job ticket.

ROLLING MILL DIVISION
Meriden, Connecticut

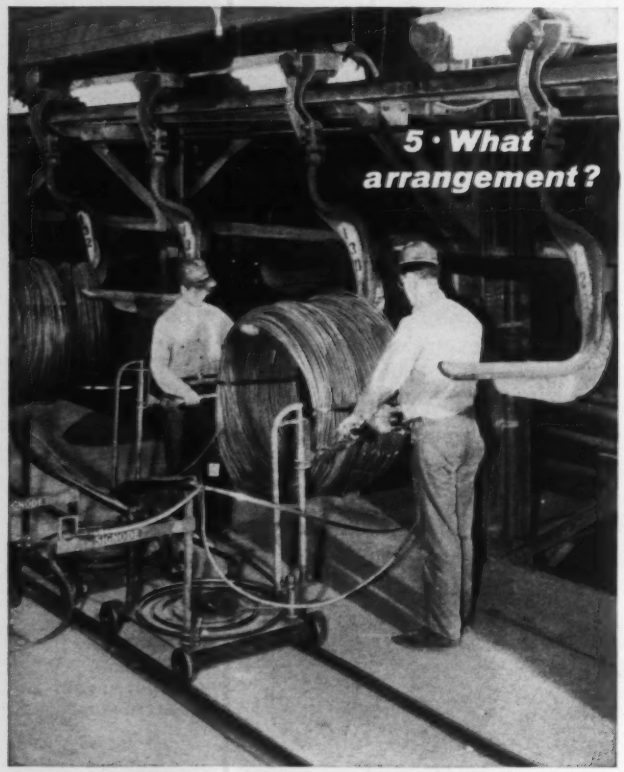
miller SINCE 1884

Tube Subsidiary
A. H. WELLS, INC.
Waterbury, Connecticut





5 Basic Strapping Questions...



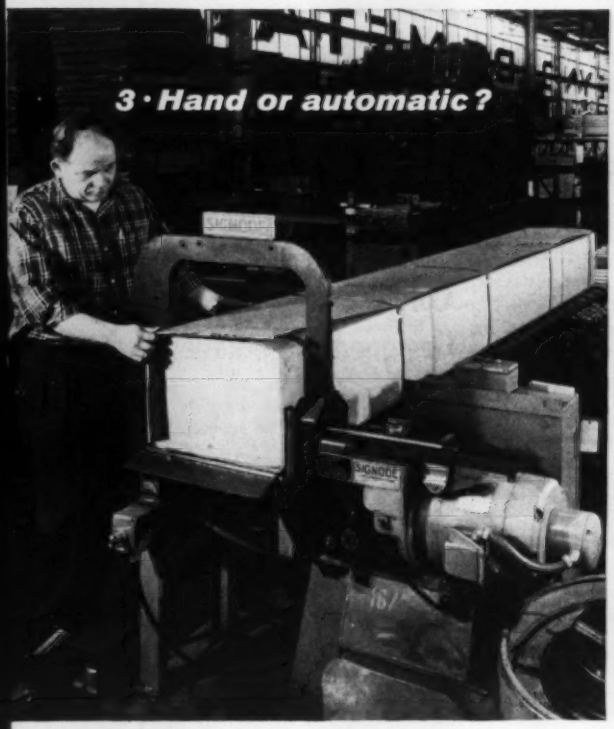
1. Where do you put the straps and how many should you use?

2. What kind and size of strapping is best for the application?

3. Should you use hand tools, power tools, or automatic strapping machines?

4. Would a simple jig or fixture help?

5. How should the work, the material flow, the tools, and the equipment be arranged?



Wrong answers are costly... right ones are free

If you have the right answers to these five questions, chances are that steel strapping is saving you money, making your products cost less to handle, ship, store, and receive.

But will those answers stay right? Your business does not stand still, any more than ours does. New products, new packages, new methods, new customer demands come along. Yesterday's right answers may be today's wrong ones.

You need right answers *on a continuing basis*—and you get them free from Signode, with the help of—

- trained packaging and shipping specialists.
- the widest selection of hand and power strapping tools and automatic strapping machines.
- the most complete testing and engineering facilities.
- 48 years of experience in solving packaging, handling and shipping problems.

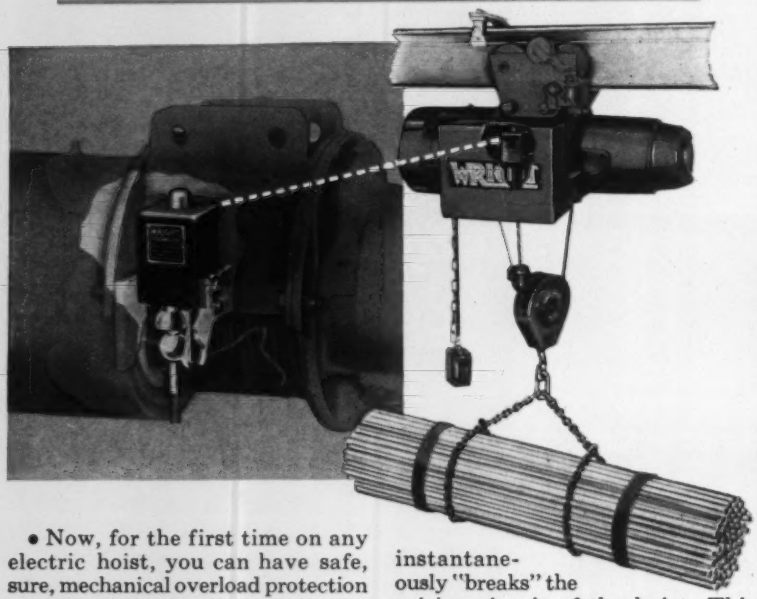
Why settle for less? For right answers, call the Signode man near you, or let us put him in touch with you.

First in steel strapping

SIGNODE
STEEL STRAPPING CO.
2645 N. Western Avenue, Chicago 47, Illinois
Offices Coast to Coast, Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

New from Wright!

Built-In Overload Protection for Operator, Load and Hoist with the New Wright Overload Cutoff*!



• Now, for the first time on any electric hoist, you can have safe, sure, mechanical overload protection as a built-in feature with the WRIGHT Overload Cutoff. Designed and built to fit any new Wright Speedway Electric Hoist, the Overload Cutoff unit you see pictured above is a compact, integral part of the hoist frame itself. As a result, it becomes a functional part of the hoist at no sacrifice in headroom. The WRIGHT Overload Cutoff is simple in design and should give dependable, trouble-free operation during the entire life of the hoist under normal operating conditions. Calibrated and sealed at the factory for the user's protection, the unit takes rugged abuse up to the critical point of overload—then instantaneously "breaks" the raising circuit of the hoist. This allows the load to be safely lowered to the floor and unhooked. Once this is done, the raising circuit of the hoist is again automatically restored. The Wright Overload Cutoff is available now as standard equipment on all new WRIGHT Frame 2 and 3 Speedway Electric Hoists, and as optional equipment on new Frame 1 and 1½ models.

Find out how WRIGHT Speedway Hoists equipped with Overload Cutoff can bring practical, fast-acting overload protection to your material handling operations. For complete information, write our York, Pa., office.

*Patent applied for

ACCO

See your WRIGHT Distributor about the Speedway Electric Hoist line or write us for literature

WRIGHT HOISTS

Wright Hoist Division • American Chain & Cable Company, Inc.

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

NEW PRODUCTS and equipment

(*Concluded from Page* 183)

For further information, *write* Power Tool Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Cold Wall, Vacuum Furnace Designed as Packaged Unit

A VACUUM, heat treating furnace developed by Stokes has a tantalum hot zone 7 in. in diameter and 14 in. high. A molybdenum hot zone may also be used. The unit loads from the top. Temperatures range up to 4582° F.

A cold trap (at the rear of the

work chamber) cooled by liquid nitrogen is an integral part of the packaged unit. The cold wall, resistance heated unit can be adapted for a wide range of heat treating, sintering, brazing, and annealing. Only air, water, electrical, and mechanical pump connections are needed to put the furnace into operating condition, the company reports.

For further information, *write* F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Particles Separated By Electric Feeder

PROCESSES requiring particle separation or dust removal can benefit from an electric feeder offered by Cleveland Vibrator.

Model 50SC consists of two flat chambers divided by a screen or grid that sifts dust or small particles into the lower chamber. Discharge openings at the end of each

STEELMAKING AT JESSOP

Survival? It could depend on a 3,000-mile picket fence

Ever-vigilant sentinels against surprise attack are the radar installations along the DEW Line. Stretching 3,000 miles across Canada and Alaska, this electronic fence is our first line of defense.

At bleak, lonely outposts Air Force and civilian technicians watch for tell-tale blips on radarscopes—Distant Early Warning of the possible approach of enemy aircraft or missiles.

This all-weather system must withstand the worst of the elements—sub-zero temperatures, high velocity winds, rain, snow and ice storms common to the Far North. And dependability of the equipment could determine whether or not we survive an attack.

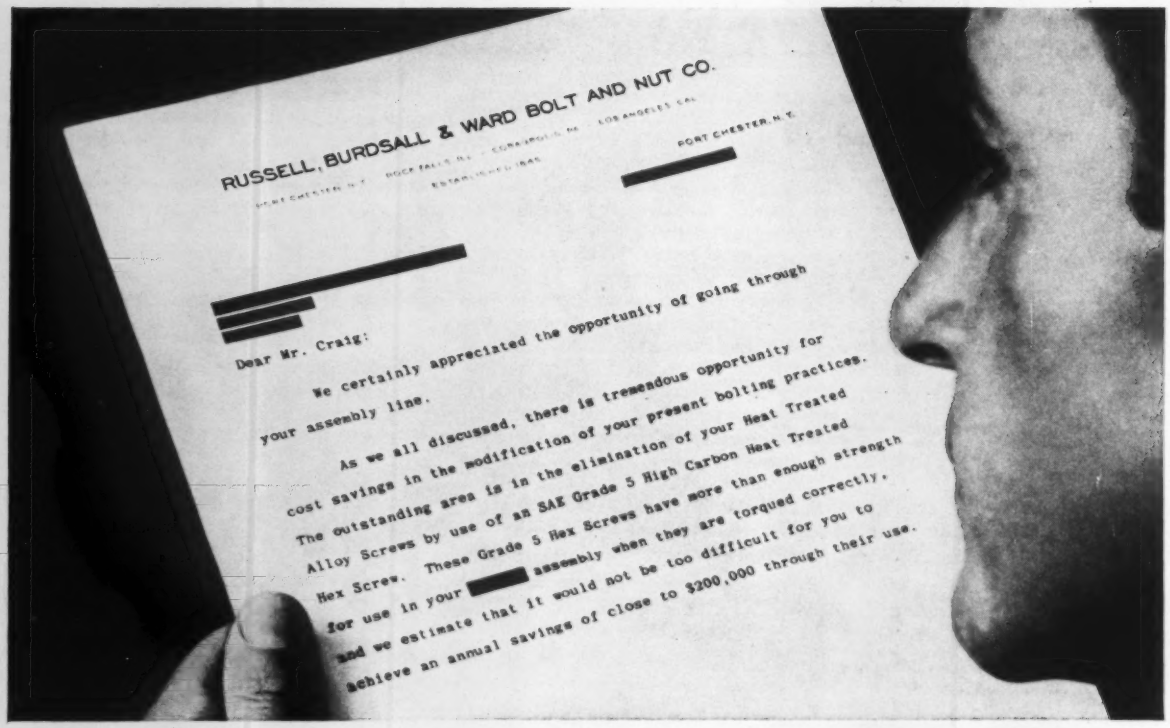
There are numerous applications for specialty steels made by Jessop Steel Company in DEW Line installations. For example, forging quality alloys and wear-resistant tool steels for the gear mechanism of a rotating surveillance radar; cast-to-shape steel for certain other component parts and precision ground steels for delicate instrumentation.

Jessop is keenly aware of the importance of built-in dependability in the steelmaking process—whether meeting specifications for steel to be used in the nuclear reactor of a Polaris-firing submarine; a Redstone missile to launch an astronaut; an earth-girdling satellite; or a DEW Line radar installation.

Yes, for dependability, you can rely on Jessop . . . the *big* name in specialty steel.

Plants and Service Centers:
Washington, Pa. • Los Angeles • Chicago • Detroit • Owensboro, Ky. • Wallaceburg, Ont.

JESSOP


RUSSELL, BURDSALL & WARD BOLT AND NUT CO.
PORT CHESTER, N.Y.
[redacted]
Dear Mr. Craig:
We certainly appreciated the opportunity of going through your assembly line.
As we all discussed, there is tremendous opportunity for cost savings in the modification of your present bolting practices. The outstanding area is in the elimination of your Heat Treated Alloy Screws by use of an SAE Grade 5 High Carbon Heat Treated Hex Screw. These Grade 5 Hex Screws have more than enough strength for use in your [redacted] assembly when they are torqued correctly, and we estimate that it would not be too difficult for you to achieve an annual savings of close to $200,000 through their use.

Eliminates big waste of dollars

Fastener value analysis study by RB&W reaps rewards without design changes

You see above an excerpt from a letter written to a large manufacturer by an RB&W technical advisor. Subsequently he submitted two detailed reports to document how savings could be achieved.

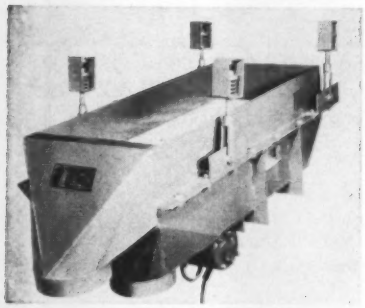
Because of the nature of the product involved, the manufacturer didn't want to make engineering changes. They preferred an alternative RB&W recommendation—substituting the proper standard screw in place of alloy screws—size for size. The cost reduction made possible: nearly $100,000 annually!

Opportunity for savings may not be so great at your plant. But they're bound to be worthwhile.

For instance, the difference in cost between a $\frac{3}{8}$ x 1 socket-head screw and a bright hex screw is about 5¢. Not much of a saving in itself. But suppose you use 150 of these socket-head screws in just one product. The saving is $7.50 per unit. If you produce 1000 units each year, that's savings of $7,500. With a line of ten such products, the *profits* saved would conceivably be $75,000 or more.

This is "value analysis" with a high dollar dividend. Take advantage of it by consulting with an RB&W Fastener Specialist. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Sales office and warehouse at: San Francisco, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas.



chamber feed the separated materials into drums, bags, tote bins, or back into the material handling system.

An electric rotary vibrator mounted under the feeder moves the materials along the length of the feeder and provides a rapid sifting motion. The movement deposits dust into the lower chamber without throwing it into the surrounding area.

The unit is suspended on springs that do not require tuning or adjustment. Rate of separation varies, depending on the type of material being handled and the slope of the feeder. Coke and dust deposited in surges are screened at a rate of about 4 cu ft per minute.

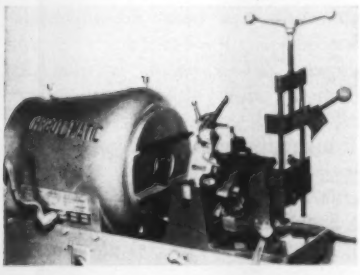
You can order units 2 to 6 ft long and 12 to 24 in. wide.

For further information, *write* Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio.

Threading Machine Has Automatic Double Chuck

FEATURES of the Collins Thred-O-Matic "44" include an automatic double chuck, fast make-on, few manual operations, and die head versatility.

You can choose from an array



THIS IS SHOT ● AND THIS ◆ IS GRIT. WE MAKE BOTH IRON ▲ AND ⊛ STEEL*. QUALITY IS CONTROLLED ▲ ▲ ▲ OF COURSE. WE THINK THEY'RE THE MOST ☜ "PERSUASIVE ABRASIVES" MONEY ◉ CAN BUY. OUR CUSTOMERS DO, TOO.

*Made in our modern electric furnaces.

CLEVELAND is the name and the place for PERSUASIVE ABRASIVES

CLEVELAND METAL ABRASIVE COMPANY

World's Largest Production Capacity

GENERAL OFFICE: 888 East 67th Street • Cleveland 3, Ohio

3560-CMA PLANTS: AT Howell, Michigan; Toledo; Cleveland • Teletype: CV 901

Mr. SHOTT and Mr. GRITT

For a better finish

start with AMASTEEL SHOT AND GRIT

GENUINE ELECTRIC FURNACE STEEL ABRASIVES

ALLOY METAL ABRASIVE COMPANY

ORIGINATORS OF CAST STEEL SHOT

121 South Division Street, Ann Arbor, Michigan • Area Code: 313 663-8529

NEW PRODUCTS and equipment

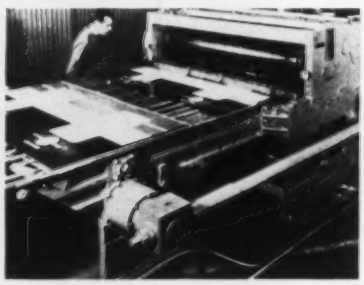
of mono, dual, or universal scroll adjustment die heads, all with built-in automatic oil flow. Mono die heads may be ordered with attached reamers that permit simultaneous threading and reaming.

Range of the "44" is 3/8 to 4 in. in pipe and conduit and 5/8 to 3 in. in bolts. It can be equipped with either a high speed tool cutter wheel or a knife type cutoff using a high speed tool steel cutting blade.

For further information, *write* Collins Machinery Corp., Monterey Park, Los Angeles, Calif.

Spot Coater Equipped With Air System

A LINE of spot coaters made by Wagner Litho incorporates an air flow and vacuum system to handle nonferrous and ferrous sheets. The equipment was developed for metal decorating and canmaking.



The air system replaces magnets formerly used when ferrous sheets predominated in the decorated metal and can industries. The spot coaters can handle standard sheet sizes.

For further information, *write* Wagner Litho Machinery Div., National-Standard Co., Niles, Mich.

Turntable Lifts Offered

A VARIETY of turntable lift combinations has been developed by Specialty Equipment Corp. The one shown, SEC-Type 4, is used for changing flow direction, to power lift loaded conveyor sections, and to manually rotate and lower loads. It is available in 3, 4, and 5 ft square sections.

Specifications include a conveyor

(*Please turn to Page* 194)

ELPAR ACRO-SMOOTH TRUCKS
Make Tough Jobs Easy

. . . hauling sand, transferring delicate loads, moving hot castings, carrying heavy loads over rough floors—these are everyday jobs for ELPAR electric power trucks. In these tough foundry jobs, top quality ELPAR trucks pay off. And they will pay off on the toughest jobs in your plant too.

You can always rely on ELPAR trucks. They are built to handle more loads at the lowest cost.

For information on ELPAR trucks for your plant, ask for the ELPAR Condensed General Catalog.

ELPAR

ELECTRIC TRUCKS

The Elwell-Parker Electric Company
4101 ST. CLAIR AVENUE • CLEVELAND 3, OHIO
In Canada: International Equipment Company, Ltd.

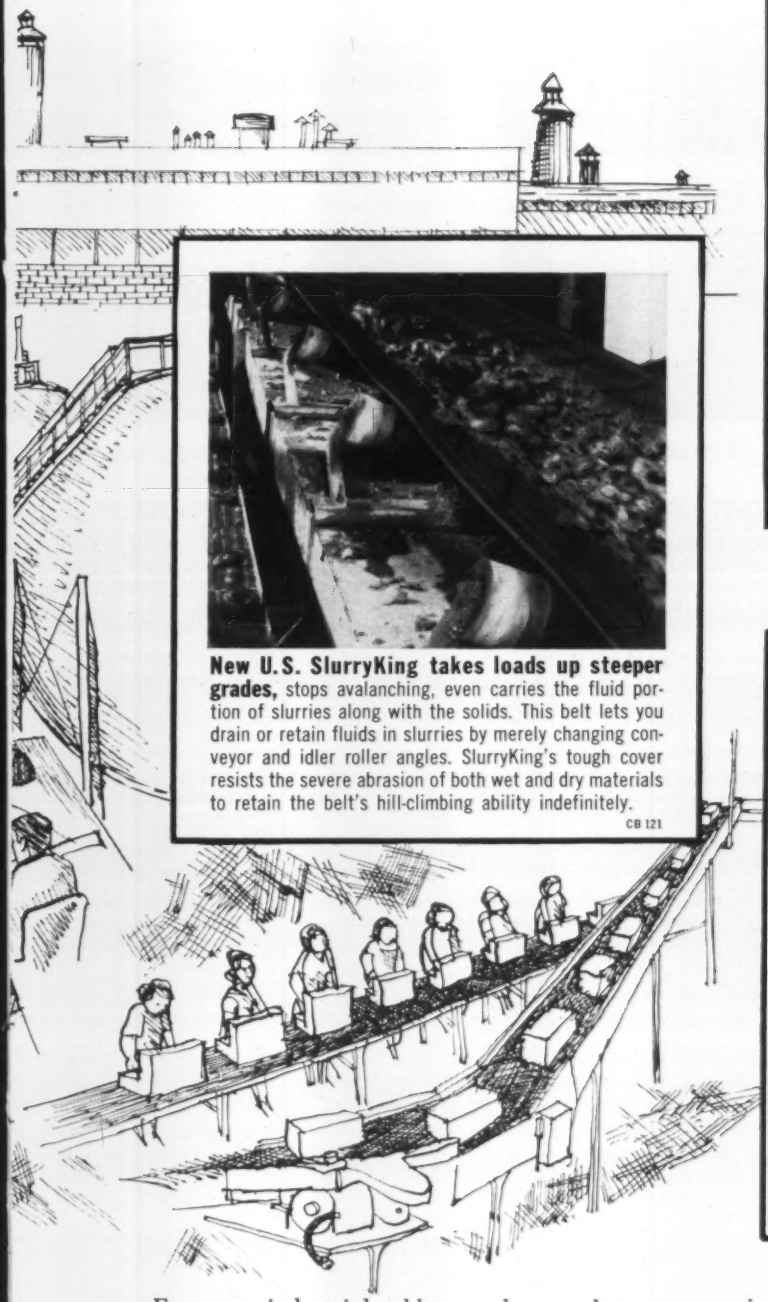
TWICE THE LIFE . . . ONE THIRD THE OPERATING COST

US AT THE HEART OF INDUSTRY...

A murderous combination meets its master in this leading Southern foundry as U.S. FoundryGiant RipStop Conveyor Belts withstand hot foundry sand loaded with jagged pieces of cherry-red tramp iron... last 8 times longer than other belts. Special internal wire ribs prevent jagged pieces of metal flash, sprues, gates, and other abrasive material from tearing and wrecking the belt.

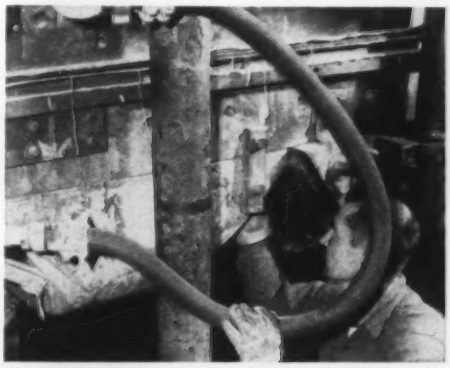
CB 114

Wherever industry needs "muscle" for the job, it calls on US. U.S. Rubber products make jobs easier, more efficient, more profitable for manufacturer and operator alike. By understanding and meeting the needs of industry, US has become the world's largest producer of industrial rubber products.



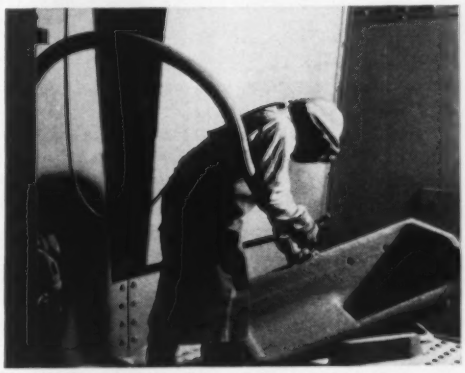
New U.S. SlurryKing takes loads up steeper grades, stops avalanching, even carries the fluid portion of slurries along with the solids. This belt lets you drain or retain fluids in slurries by merely changing conveyor and idler roller angles. SlurryKing's tough cover resists the severe abrasion of both wet and dry materials to retain the belt's hill-climbing ability indefinitely.

CB 121



Live steam, inches away — yet this man's safe, next to the hose that death-causing steam cannot burst. U. S. Matchless® Steam Hose has its own built-in safety device. When it's ready for replacement, the wire-braid construction prevents it from bursting. Instead, just a wisp of steam seeps through, letting you know it's time for a new hose.

H 109



In the tough jobs like this one, U. S. Rainbow® Sandblast Hose demonstrates its exceptional qualities. Carrying sand or steel shot after other hoses have failed, this hose provides safety as well as long wear. Its durable rubber tube is especially treated with a highly conductive material to dissipate static electricity, and its strong carcass flexes easily to prevent kinking.

H 122

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber

MECHANICAL GOODS DIVISION

Want to strip "unstrippable" coating?

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS

Even tough EPOXY FINISHES peel off in Oakite STRIPPER S-A

Burn off an epoxy finish from a reject as a last resort? Not at all necessary. Oakite STRIPPER S-A strips metals clean. That's true for multiple coats as well as single coat epoxy finishes. Look at STRIPPER S-A's record:

- *A 3/16" thick coating built up from layers of epoxy coating and wrappings of fiber glass was stripped from gun barrels by overnight soak in Stripper S-A. Everything tried previously had failed.*
- *Brass plated steel parts were stripped of their epoxy finish in matter of minutes.*
- *Workholding spindles and racks laden with at least 10 coats were stripped to bare metal by a short soak. Paint hooks formerly burned clean are now soaked clean instead.*

This powerful stripper is safe for all metals except zinc and magnesium. And it's safe to the user, since it works cold . . . has no flash point . . . rinses with water.

STRIPPER S-A is but one of a long list of superior strippers by Oakite. Some are specially formulated for use on steel . . . aluminum . . . other metals. Some for removing lacquers . . . tough synthetic finishes. Still others are designed especially for removing paint from vertical surfaces. Whatever your paint-stripping problem—Oakite is bound to have the answer. Ask your local Oakite man or send for paint-stripping bulletin F-7893. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

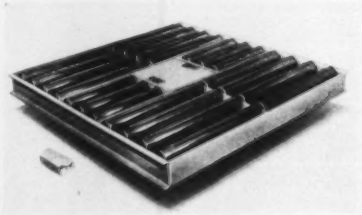
it PAYS to ask Oakite

OAKITE

SCIENCE

over 50 Est. 1909 years' leadership in industrial cleaning

NEW PRODUCTS and equipment



(*Concluded from Page* 190)

lift of 5 in., minimum over-all height of 15 in., 360 degree rotation in either direction, and lifting capacity of 2700 lb for 3 ft sections, 2600 lb for 4 ft sections, and 2500 lb for 5 ft sections.

Other styles available include the SEC Type 1, pneumatic lift turntable; SEC Type 2, pneumatic lift turntable with stationary, custom conveyor section; SEC Type 3, pneumatic lift, manually rotated turntable; SEC Type 4P, pneumatic lift turntable with power rotated, custom conveyor section; and SEC Type 5, two way, right angle, pneumatic lift with a nonrotating turntable.

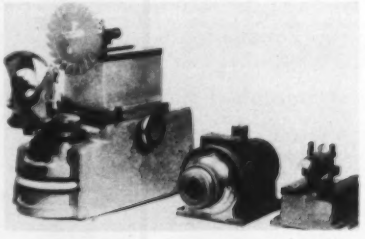
For further information, *write* Specialty Equipment Corp., 290 Park Ave., Worcester 9, Mass.

Machine Checks Many Tool Design Elements

A TOOL analyzer made by Stocker & Yale provides a quick and accurate method of presetting tools for use in automatic equipment. The maker says it can be used in checking complete cutting geometry of small tools.

Diameters, depths, and proper tool location can be set to 0.0001 in. accuracies. Advantage: Cutting tool geometry can be checked at the same time that the tool is being preset. The device can also be used to check for tool wear.

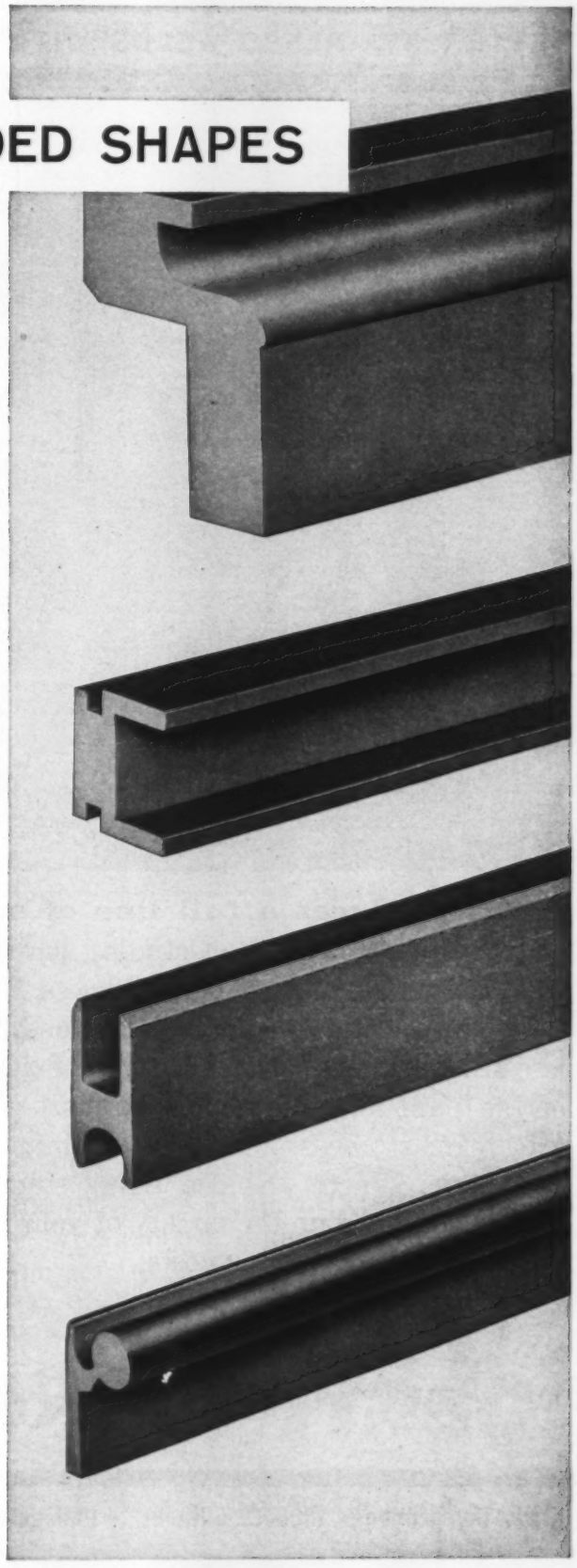
The analyzer can measure such



ANACONDA EXTRUDED SHAPES

preformed to cut fabricating costs

...preferred for superior quality!



Would you like to reduce machining, scrap, and finishing by *cutting* parts from long lengths of extruded shapes?

Anaconda shows you how . . . by designing long lengths of "pre-machined" shapes exactly suited to the parts you need. Parts made from these extruded brass shapes are characterized by their strong, homogeneous, wrought-metal structure. They are superior, long-wearing parts that *improve* the quality of your finished product. What's more, the smooth, extruded surfaces also reduce many finishing operations —additional savings for you.

Discover why more and more manufacturers are cutting fabricating costs and maintaining better quality by using these preformed shapes. Let our technical service personnel lend practical—and imaginative—help in adapting extruded shapes to the economical production of intricate parts.

Call your Anaconda representative or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 61-1063

EXTRUDED SHAPES

ANACONDA®
AMERICAN BRASS COMPANY

BETTER STAINLESS WELDS WITH ARCOS

Arcos produces a full line of stainless filler metals...coated electrodes, bare electrode wire, consumable inserts, bonded fluxes. This across-the-board selection of filler metals, plus Arcos stainless welding know-how, assures you of the selection of the right filler metal for the most economical arc-welding process—manual, semi-automatic or automatic. Where you use Arcos stainless filler metals you build up the quality of your welds and push down your welding costs.

ARCOS

Arcos Corporation • 1500 S. 50th St. • Philadelphia 43, Pa.

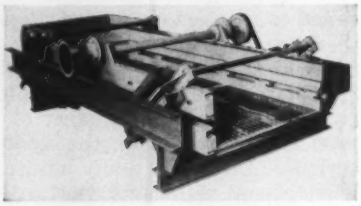
NEW PRODUCTS and equipment

things as hook or rake angles in flutes and spiral points, indexing of cutting edges, concentricity and thickness of web, chamfer angle, relief and length, thread form and relief, flank angles, lead, comparison of surface finish, major and minor diameters, pitch diameter, web thickness, width of lands/flutes, and included point angles.

For further information, *write* Stocker & Yale Inc., 194 Green St., Marblehead, Mass.

Little Headroom Needed For Vibratory Screen

A HORIZONTAL vibratory screen (Kobold model) made by Comco Corp. transmits little vibration to supporting structures. It's light and requires little headroom (less than 2 ft 10 in. for the 60 ton per hour type). Power requirements are



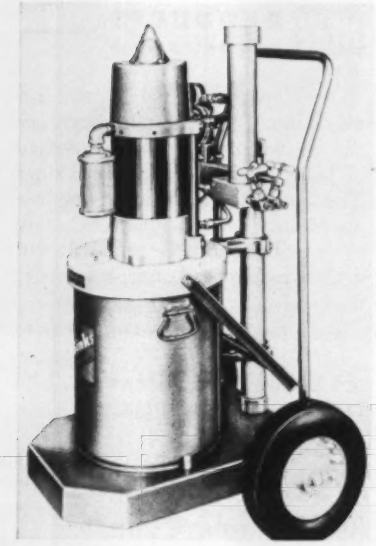
minimized by a combination of a positive eccentric drive with natural rhythm shear block springs.

For further information, *write* Comco Corp., 5421 Lancaster Ave., Philadelphia 31, Pa.

Airless Spray Unit Handles High Volume

AN AIRLESS spray unit for high volume, multiple gun operation has been announced by Binks. The Titan has a 21 to 1 pumping ratio and will pump 3 gpm under continuous duty conditions. Two models are available.

One model, a 10 gallon unit, is mounted on a rollaround cart for on-site, multiple gun operation. The other is designed to pump directly from 55 gallon containers. The basic pumping unit is similar to the portable model. Both will



handle the large orifice tips necessary to apply thick coatings.

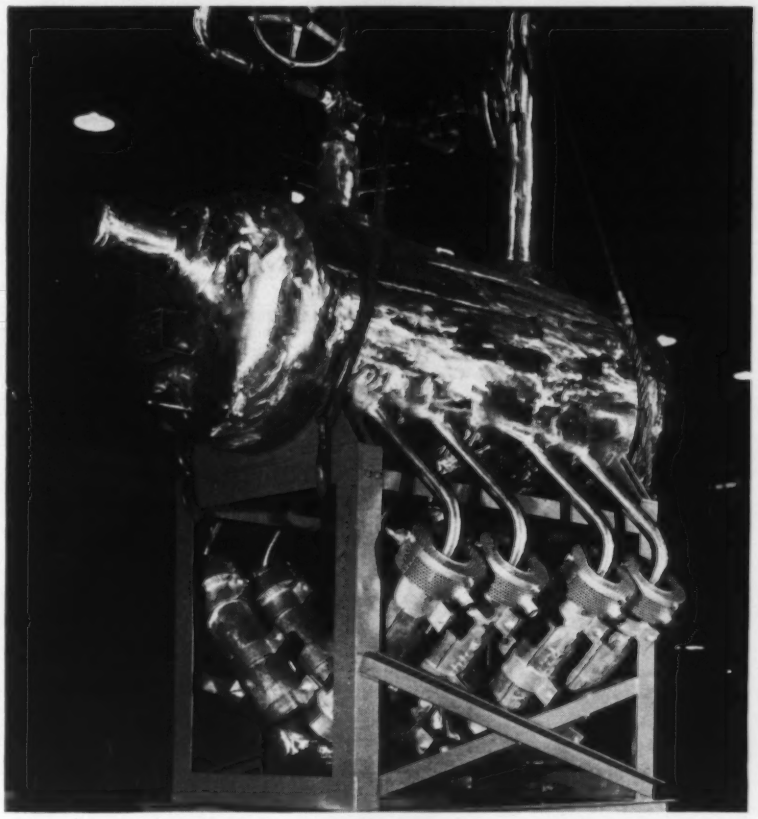
For further information, *write* Binks Mfg. Co., 3140 Carroll Ave., Chicago 12, Ill.

Aluminum Wound Magnets Are Highly Adaptable

GREAT lifting capacity and light weight are featured in a line of aluminum wound magnets. Standard sizes include 39, 46, 56, 61, and 71 in. diameters. Other sizes are available on special order.

The magnets are highly adaptable. They have an extra deep field for penetrating into light gage scrap and turnings. They're also suitable for use with heavy castings,

ARCOS EB INSERT FOR ROOT PASS WELDING

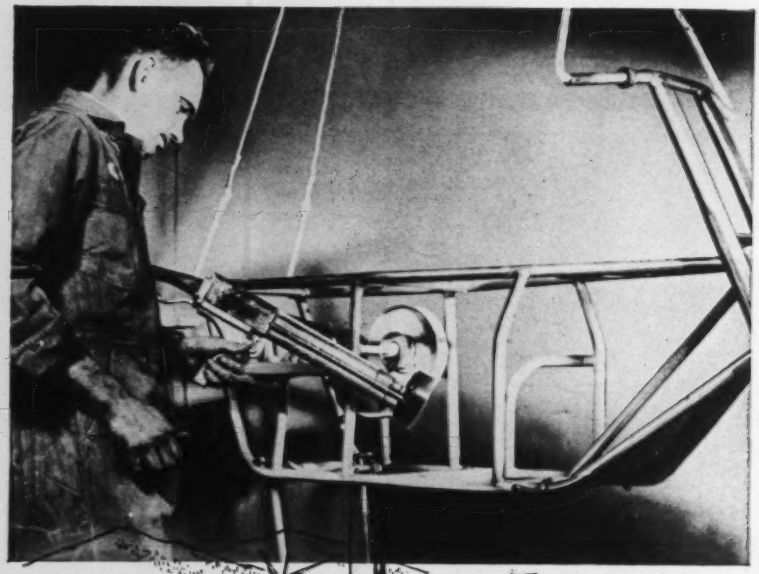


Job report courtesy of Dominion Bridge Co., Ltd., Montreal, Quebec

Smooth, crack-free root welds made in nuclear pressure vessel from one side only. This NRU reactor surge tank is made of Type 347 stainless, 3" thick with 26" I.D. It is designed for operation up to 630°F. at 2400 psi. Because welding could be done from the outside only, Arcos EB Consumable Weld Inserts were used for the root passes. Result: complete fusion, crack-free, with smooth inner surface. Write today for complete data on EB Weld Inserts.

ARCOS

Arcos Corporation • 1500 S. 50th St. • Philadelphia 43, Pa.



RANSBURG
Hand Gun Cuts Paint
Costs 35%—Painting Time
25% Over Former Flo-Coat in the
Production of **TOTE GOTE** Cycles

Continually searching for better and faster manufacturing methods, the Bonham Corporation, Provo, Utah, switched from flo-coating to Ransburg Electrostatic hand spray to paint their Tote Gotes. The Tote Gote is an "off-highway" cycle, especially popular with hunters and fishermen who use it to travel over rough and rugged terrain not readily accessible by highways and roads.

Now, with electrostatic spray painting, Bonham is getting an improved uniform coating . . . a 35% savings in paint cost . . . and painting time is cut 25%. And this over flo-coat!

The predominately tubular construction of the Tote Gote makes it particularly adaptable for painting with the Ransburg No. 2 Process Hand Gun. That's because the "wrap-around" feature of electrostatic painting covers all such areas from one side only.

NO REASON WHY YOU CAN'T DO IT TOO

See how the Ransburg Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. Or, if your production justifies, it will pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Send for our No. 2 Process brochure which cites numerous examples of modern production painting in both large and small plants.

RANSBURG

RANSBURG Electro-Coating Corp.
Box 23122, Indianapolis 23, Indiana

Affiliates in AUSTRALIA • AUSTRIA • BELGIUM • BRAZIL • DENMARK • ENGLAND • FRANCE • FINLAND GERMANY • HOLLAND • INDIA • IRELAND • ITALY • NEW ZEALAND • NORWAY • PAKISTAN • SOUTH AFRICA SPAIN • SWEDEN and SWITZERLAND

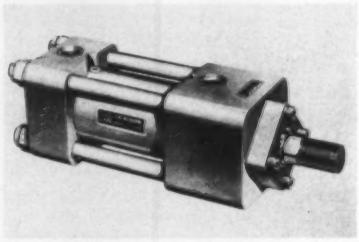
NEW PRODUCTS and equipment

forgings, pigs, or other ferrous metal shapes. The manufacturer says the units combine the advantages of bolted and welded constructions. The coil is wound with anodized aluminum for 75 per cent duty cycle. The unit is supplied with a cast, manganese steel, suspension chain.

For further information, *write* Ohio Electric Mfg. Co., subsidiary of Howell Electric Motors Co., 5400 Dunham Rd., Maple Heights, Ohio.

Three Use Classes Covered By Hydraulic Cylinders

THREE basic lines of hydraulic cylinders have been announced by Denison: 2000 psi units for machine tools, 2000 to 3000 psi all purpose units meeting JIC specifications, and 5000 psi units designed to work with Denison's 5000 psi pumps and fluid motors. Bore sizes range from 1⅛ to 14 in. in 17 mountings.



For further information, *write* Denison Engineering Div., American Brake Shoe Co., 1160 Dublin Rd., Columbus, Ohio.

Rust Converting Primer Protects New Metal Too

A PROTECTIVE coating, Zincilate RCP rust converting primer, repairs rusted ferrous surfaces. When applied (by brush or spray), RCP penetrates to the base metal, converting rust into an iron phosphate coating that is said to completely sever contacts between the rust and the metal. Created is a moisture-proof primer that effectively prevents future rusting. A separate

LET MUELLER MAKE IT!

Mueller Brass Co. of Port Huron is much more diversified than the name "Brass" implies . . . a lot more. In fact, because of its many and varied facilities . . . its *men, methods* and *metals* . . . Mueller is in the unique position of being able to offer true single source service.

MUELLER HAS THE MEN . . . experienced engineers with the ability to work out, creatively, tough design problems, and improve a part or components for production by the most economical method. You get sound engineering plus 44 years of practical metalworking production experience when you "Let Mueller Make It".

MUELLER HAS THE METHODS . . . when you "Let Mueller Make It", you are utilizing one single source that is able to produce parts any one of these ways: as forgings, impact extrusions, sintered metal parts, screw machine products, formed tube or as castings.

MUELLER HAS THE METALS . . . and the materials . . . to produce precision parts in aluminum, brass, bronze, copper, iron and steel in hundreds of different alloys to meet each exact requirement.

In addition, Mueller Brass Co. has complete and modern facilities for performing all types of finishing and sub-assembly operations. Another plus value is nation-wide sales engineering service.

So, in the final analysis, no matter where you fit in the American industrial picture, whether you're making missiles or mowers . . . and no matter where you're located, it will pay you to LET MUELLER MAKE IT!

MUELLER BRASS CO. PORT HURON 26, MICHIGAN

340

primer coat is not required.

The material is available clear or in standard primer colors. The clear coating is useful in protecting new materials. On clean surfaces, it etches the metal to create a firm bond and complete protection even when materials are stored outdoors for extended periods.

The manufacturer says surface preparation under extreme conditions is limited to simple degreasing. The material can be successfully applied directly over any tightly adhering rust or scale. In lightly rusted areas, it returns the base metal to its original appearance. The primer coat accepts a decorative topcoat 2 hours after application without further preparation. Sound surfaces are not affected.

For further information, *write* Industrial Metal Protectives Inc., 401 Homestead Ave., Dayton 8, Ohio.

PROFITS are built on DEPENDABILITY

Improve the Quality and Appearance of your welds while you save 20% or more with *Aronson* POSITIONERS

A large mining equipment plant has taken another step forward with the addition of an Aronson 32,000 pound Headstock and Tailstock Positioner in its structural department for the welding of shuttle bodies and frames.

With the installation of Aronson Headstock and Tailstock Positioners the car bodies can easily be rotated into position to bring seams and weld locations in a flat or downhand position. The result is a considerable saving in time, but moreover the quality and appearance of the welds are very superior to previously unpositioned work.

These machines are designed to give long dependable service . . . and profits are Built on Dependability.

ARONSON BUILDS THE MOST COMPLETE LINE OF POSITIONERS
. . . WITH CAPACITIES RANGING FROM 25 POUNDS TO 600 TONS

Universal Balance® Positioners • Bench Turntable Positioners • Gear Driven Positioners
Headstock-Tailstock Positioners • TracTred® Turning Rolls • Turntables
Fully Automatic Positioners • Geared Elevation Positioners • Magnetic Welding Clamps

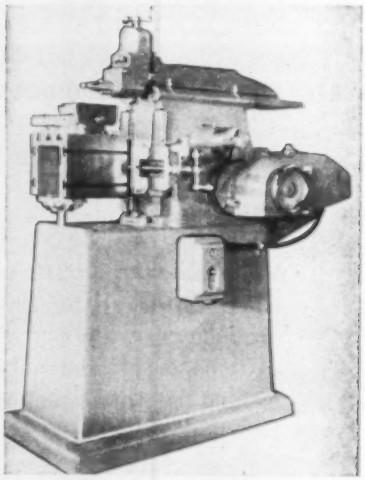
Write for detailed engineering data

Quality PRODUCTS by *Aronson* MACHINE COMPANY, INC.
ARCADE, NEW YORK

Shaper Design Feature Provides Fine Finishes

KEY feature of Havir's 8 in. shaper is its ability to produce fine finishes. The company says it's achieved by cutting the bull gear and pinion at a righthand helical angle and cutting the drive gear and pinion at a lefthand helical angle. That gives a herringbone gear effect to the finished surface, adding extra smoothness without gear tooth reproduction on work.

All operating surfaces are ground



and hand scraped. Standard equipment includes a swivel table, swivel base vise with steel faced jaws, tool post wrenches, cranks, and motor drive. The unit is 44 in. long, 24 in. wide, and 51 in. high.

For further information, *write* Havir Mfg. Co., 444 N. Cleveland Ave., St. Paul, Minn.

Box and Pan Brake Takes 16 Gage Mild Steel

A 36 IN. CAPACITY box and pan brake (Model PX36) has been designed to combine the service and operational advantages of the Pexto PX24 brake in a larger sheet capacity.

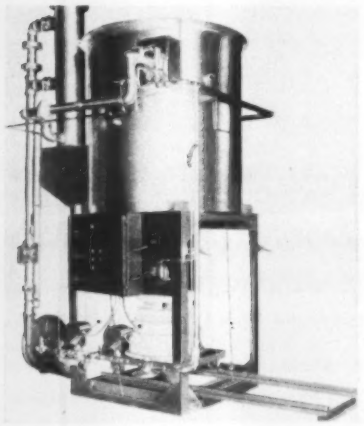
The unit is available for bench mounting or with a steel cabinet floor stand. Rigid box construction is used in the frame. Clearance between the frame and the fingers (adjustable for stock thickness) is 1 in. A reversible bed

blade is used. The flip-over finger gage has full range up to 24 in. with minimum thickness material. Eight sizes (fingers) from ¾ to 6 in. allow a width of ¾ to 36 in. (in ¼ in. increments) to be accommodated. A combination friction brake and lock is used.

For further information, *write* Peck, Stow & Wilcox Co., Southington, Conn.

Preheated Air Gives Furnace Fast Start

A COMPLETE heating and cooling program control system governs the GFHT-24 high temperature furnace developed by Harrop. It has a full FIA gas safety system and complies with JIC electrical standards. The unit quickly and economically reaches 3300° F due to use of preheated air.



The refractory shapes in the furnace arch are cast and prefired and readily replaceable from the top. The furnaces are available with setting spaces ranging from 12 in. in

VICE PRESIDENT-Operations

reports:

Soffel's

EXOTHERMIC SIDEBOARDS

"Give us the most flexible hot topping method we've ever known."

Of course, increased ingot *yield* is easily translated into the extra hundreds of dollars in out the door products.

Equally important, though not so obvious, are the labor-saving advantages you gain when you use Soffel's Sideboards.

Starting with the placement of the Sideboards in the mold, no crane is necessary except on the very large ingots. There's no interruption in pouring—pour straight up to the top. The ingot is single stripped, goes to the soaking pit quickly. All these steps reduce time and reflect in overall cost.

If you want more sound steel from every ingot, Soffel's Exothermic Sideboards will give it to you. Test them in your plant soon.

Use Soffel's EXOTHERMIC SIDEBOARDS in BIG END DOWN MOLDS

PRODUCT ADVANTAGES

- Eliminate permanent and conventional hot tops.
- Easy, and single, stripping of Big End Down molds.
- Sideboards are easily placed in head of mold by one man — crane only necessary on very large ingots.
- Longer mold life — less mold cost — less mold inventory to carry.

Soffel's Exothermic Sideboards increase ingot yield, assure top cut soundness and provide more ton steel out the door per ton of steel in the ingot.

Phone National 5-1571 today

Pittsburgh Metals Purifying Co.

A Division of Treesdale Laboratories, Inc.

MARS, PENNSYLVANIA

NON-PRODUCTIVE FLOOR SPACE . . .

rent collector in cost of possession

Dust sifting softly down on idle steel stocks . . . the costly silence of inactive dollars "invested" in idle steel . . . the "rent" piling up for space that isn't producing anything.

Here's a solution . . .

Use the complete stocks of your nearby steel service center just as if they were your very own. Their convenience and availability are augmented by other economies, too. Plus many first-step processing services your center is tooled-up to provide.

Your production and cost accounting people may want to figure the *true cost* of steel stocks. Ask your steel service center salesman for the booklet, *What's Your Real Cost of Possession for Steel?* Or write to Steel Service Center Institute.

COST OF POSSESSION . . . ***to determine your own cost of possession for steel in inventory, consider all these factors:***

Cost of capital: inventory, space, equipment — Cost of operation: space, material handling, cutting and burning, scrap and wastage — Other costs: obsolescence, insurance, taxes, accounting

YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE

540-G Terminal Tower • Cleveland 13, Ohio

Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

STEEL SERVICE CENTER INSTITUTE

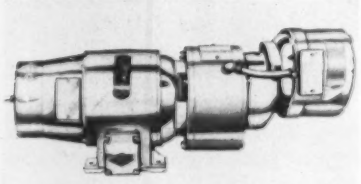
diameter and 18 in. in height to 48 x 72 in.

For further information, *write* Harrop Precision Furnace Co., 3470 E. Fifth Ave., Columbus 19, Ohio.

Crane Hoist Motor Highly Controllable

SAFE handling of sensitive and delicate loads is facilitated with a special, multidrive, crane hoist power package. Two individual motors connected by a clutch provide an extremely slow speed for delicate lifting—plus regular speeds for lifting and travel.

When the slow speed motor is engaged, the movement of the crane hook is almost undetectable, says the manufacturer. During normal lift-



ing and travel operations the power is supplied by a slip ring motor. The motor provides five individual speed steps with variations of speed and torque. The secondary, microspeed motor is cut in by a dc clutch. A wide variety of crane hoist motors are available.

For further information, *write* Reuland Electric Co., Alhambra, Calif., or Howell, Mich.

Larger Model of Highly Maneuverable Truck Made

FOR HANDLING steel sheets and other long, heavy loads, Raymond is offering a 4000 lb model of its four directional, reach fork truck.

The unit can move forward, backward, or sideways from a standing start. Wheels are hydraulically controlled.

The new model is mounted on a heavy duty, 24 volt, power unit. It has single wheel drive, power steering, and a high pressure hy-

draulic system. Other models, 2000 and 3000 lb capacities, can be ordered with or without the reach fork attachment.

For further information, *write* Raymond Corp., 91-191 Madison St., Greene, N. Y.

Vibratory Barrel Finisher Operated by Pushbutton

IMPROVED design, increased capacity, and pushbutton operation are features of the VB-6 vibratory barrel finishing machine. The unit has a 6 cu ft capacity for deburring, deflashing, polishing, descaling, and rinsing. Rinsing or unloading is controlled by pushbutton. The unit completely finishes parts, rotates to emptying position, and then tilts to facilitate unloading.

An electromagnetic drive produces 3600 vibrations per minute. The manufacturer says the unit is suitable for heavy and light gage metals, odd stampings, shielded areas, and parts with recesses. No moving parts are used in the drive.

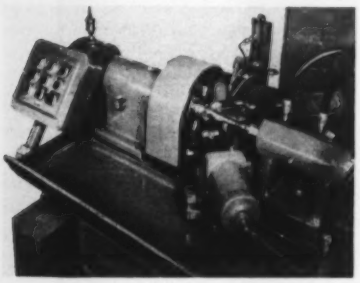
A minimum of floor space is required for the unit.

For further information, *write* Syntron Co., 370 Lexington Ave., Homer City, Pa.

Pneumatic Tool Operation Added to Fillet Rolling

ALL PNEUMATIC tool operation is one of many improvements incorporated in the redesigned DER fillet rolling machine. The unit can handle jobs such as burnishing fillets on automotive front wheel spindles and similar stubshafts.

The machine has dual heads, making it possible to process two parts at a time. Production is 240 pieces an hour at 80 per cent effi-



LESS STEEL IN YOUR INVENTORY

. . . a capital-freeing benefit offered by your steel service center

It costs you money to own the steel lying in your plant in inventory . . . from 15 to 40% a year if it lies there a few months before being used.

Dollars tied up in your own metal inventory can better be freed-up for modern machines, plant expansion, debt-retirement. But, you ask, what about a ready supply of proper steel?

Let your nearby steel service center carry your metal inventory . . . for delivery in the grade, dimensions, and quantity you need, *when* you need it, unloaded convenient to your facilities that will process it. Your steel service center can handle some first steps of pre-production processing, too . . . burning, sawing, bending, leveling. Service center salesmen are trained to give you expert counsel on grades and types, and cost-saving production short-cuts.

YOUR STEEL SERVICE CENTER

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Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

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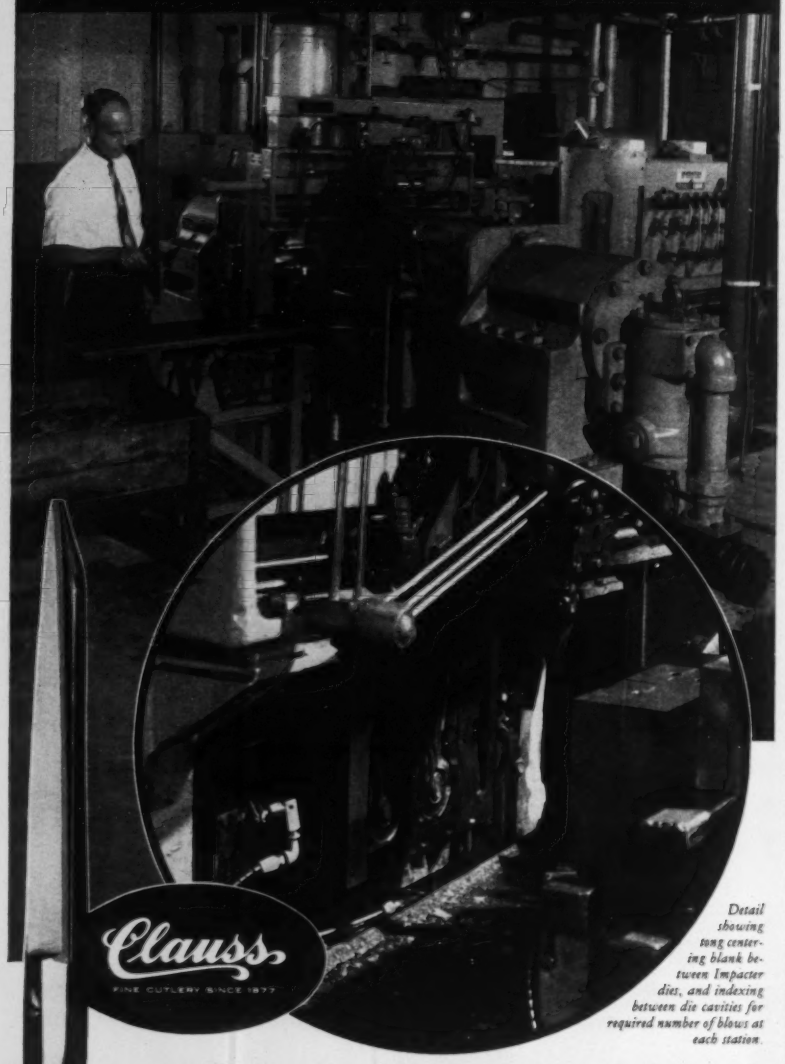
"The Model 'C' Impacter achieves new peaks of production speed and efficiency for Clauss"



Detail showing tang centering blank between Impacter dies, and indexing between die cavities for required number of blows at each station.

Scissor forgings produced automatically on the Impacter ..faster, better, more uniform

Clauss Cutlery Company, of Fremont, Ohio, famous manufacturer of scissors, shears and snips, is achieving remarkable results with the Cecomatic Forging Process, incorporating the Model "C" Impacter.

Better quality forgings are produced faster, with reduced scrap, and less stock required.

Dies last longer, scaling is reduced and parts dimensions vary less, greatly reducing mismatch of mating parts, according to R. W. Van Hook, Vice President, Clauss Cutlery Co.

Write for details and a copy of Bulletin 110-L-1, "Cecomatic Process for the Jobbing Type Production of Drop Forgings."

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

CHAMBERSBURG

THE FRANKLIN INSTITUTE'S 1961 LONGSTRETH MEDAL "FOR INVENTIONS OF HIGH ORDER" WAS AWARDED THE DESIGNERS OF THE IMPACTER

NEW PRODUCTS and equipment

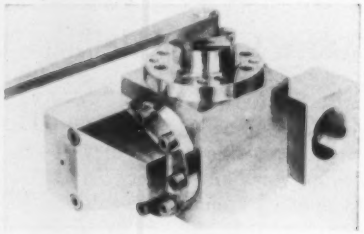
ciency. The cold working process efficiently and inexpensively eliminates fatigue failures at the fillets, says the company.

Two rollers contact the work. The contact surfaces on the roller face oscillate back and forth across the fillet as they are forced against the rotating piece. The kneading action of the rollers creates compressive stresses on the skin of the metal, superimposed over tensile stresses formed in the fibers underneath. The resulting balance of controlled stresses strengthens the fillet.

For further information, *write* Foote-Burt Co., 13000 St. Clair Ave., Cleveland 8, Ohio.

Ball Shutoff Valve Handles 6000 psig

FLUIDS under pressures up to 6000 psig can be delivered by a ball shutoff valve identified as 3-110325. Originally designed for nitrogen gas at temperatures ranging from −65 to 160° F, the valve can also handle nitrogen tetroxide. With minor modifications, the unit is suitable for service with many cryogenic fluids, missile fuels, and oxidizers at −320 to 350° F.



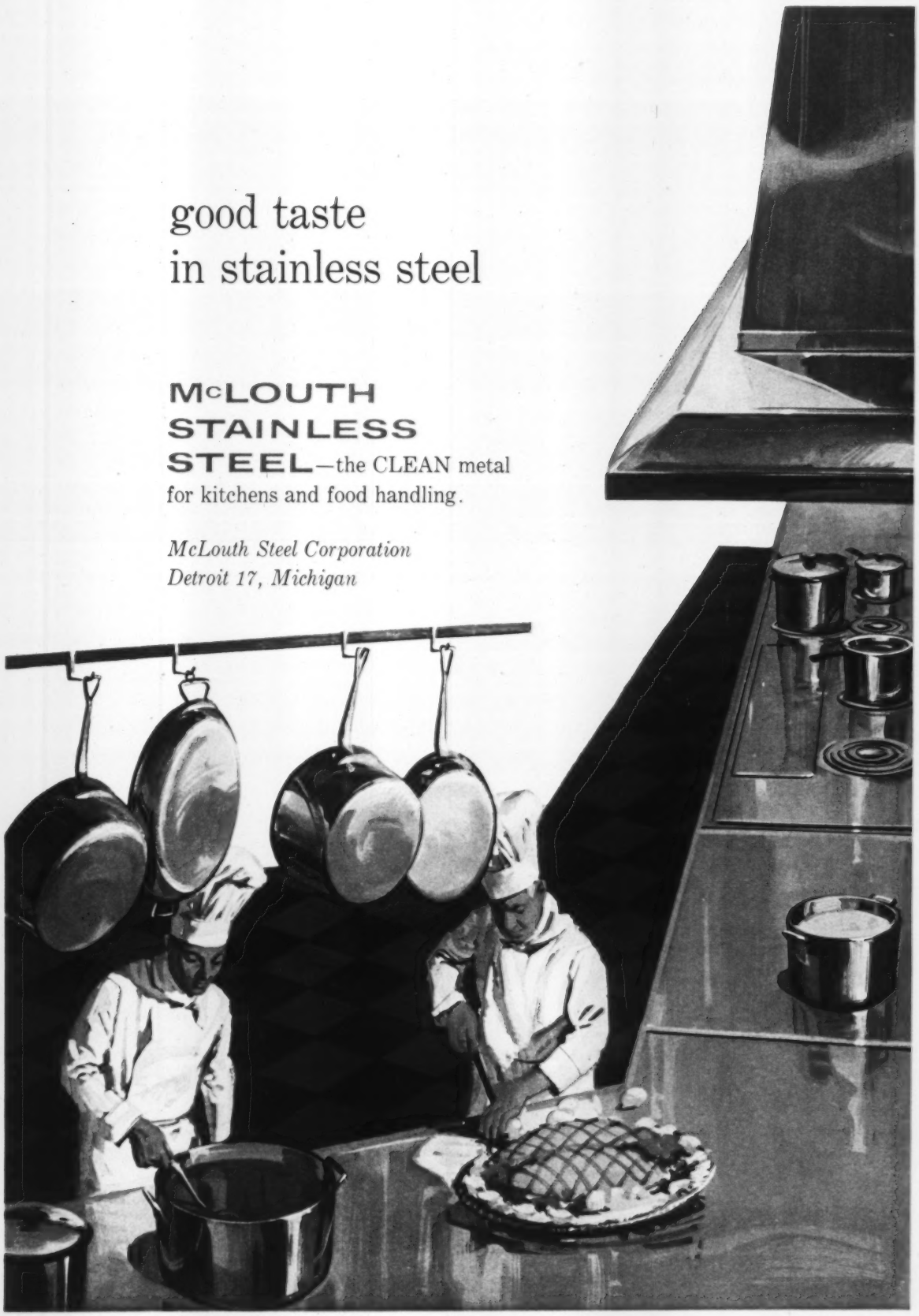
The valve has a 1½ in. line size and is part of a series of high pressure units with line sizes of ¼ to 2 in. Valve body, trim, and internal parts are stainless. Kel F or Teflon is used in gaskets and seals. It can be actuated manually, pneumatically, hydraulically, by motor or solenoid. Operating pressure is 6000 psig, with 9000 psig proof pressure, and 15,000 psig burst pressure.

For further information, *write* Koehler Aircraft Products Co., a subsidiary of New Britain Machine Co., 409 Leo St., Dayton 4, Ohio.

good taste in stainless steel

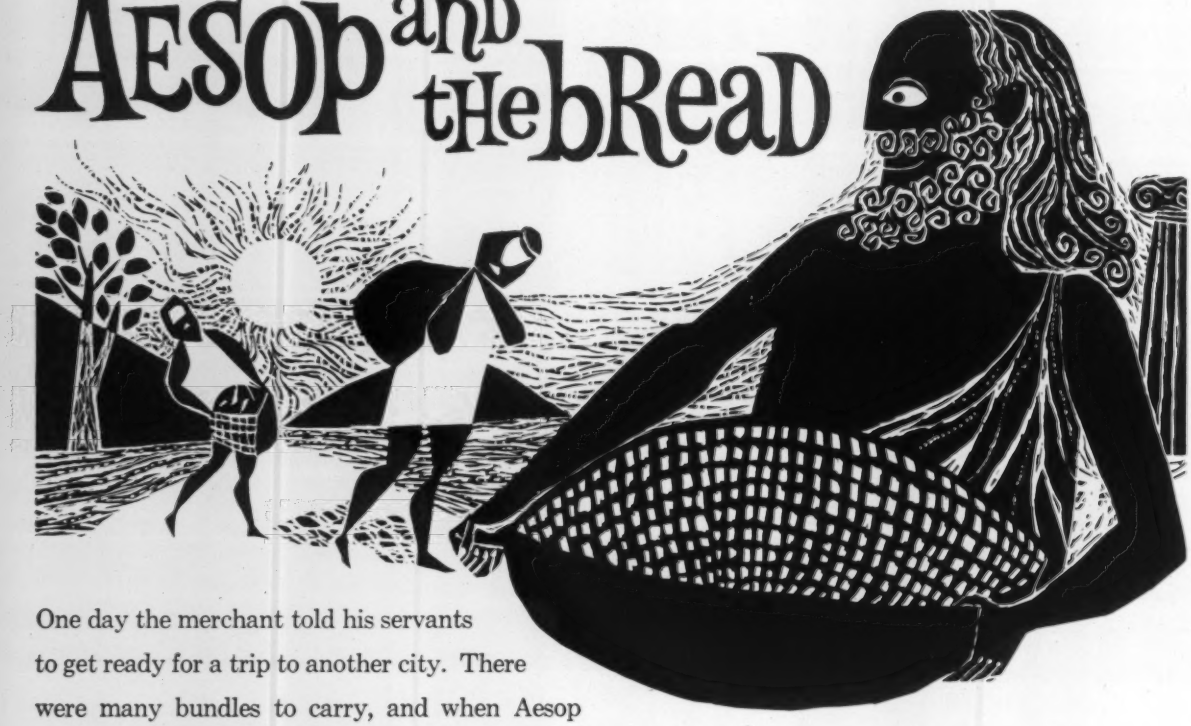
McLOUTH STAINLESS STEEL—the CLEAN metal for kitchens and food handling.

McLouth Steel Corporation
Detroit 17, Michigan



cleverness wins

AESOP and the bREAD



One day the merchant told his servants to get ready for a trip to another city. There were many bundles to carry, and when Aesop saw them all he said to his fellow servants, "If you let me carry the lightest bundle, I'll tell you many fine stories as we walk." The servants agreed because they liked Aesop's stories. But when Aesop picked up the heaviest bundle of all—a large basket of bread — the other servants laughed at him. He barely could manage to carry it. Around noon, the travelers stopped to rest and eat their dinner. Aesop gave each servant a loaf of bread for dinner, so the big basket wasn't as heavy during the afternoon. When the sun went down, Aesop gave each servant a loaf of bread for supper, and the big basket was empty. The next day the merchant and his servants went on to the city. Aesop had nothing to carry but his empty basket, so he told stories to the other servants while they struggled under their loads.

moral: Alert analysis wins out in the end.

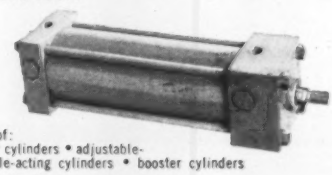
Have you analyzed your machines to make sure that proper cylinder designs are providing most efficient production? Ask your Hydro-Line representative to help you. Of course, he might try to sell you a Hydro-Line cylinder or two, but only if you really need them. And his analysis now may save you considerable time and money later.

Your Hydro-Line representative will recommend standard stock cylinders if he can . . . they have all-catalog stock dimensions, cost you less, and can be delivered immediately. If a stock cylinder is unsuitable for your application, he'll recommend the proper modified standard cylinder, which has its own stroke or other deviations from catalog stock dimensions. Either way, you can be sure that the best cylinder design is working to help you gain more production and earn more profits.

Look in *Sweet's Product Design File* (Bulletin 8a-Hy) for standard dimensions of stock cylinders and the address of your nearest Hydro-Line representative. Ask him to analyze cylinder requirements in *your* plant soon.

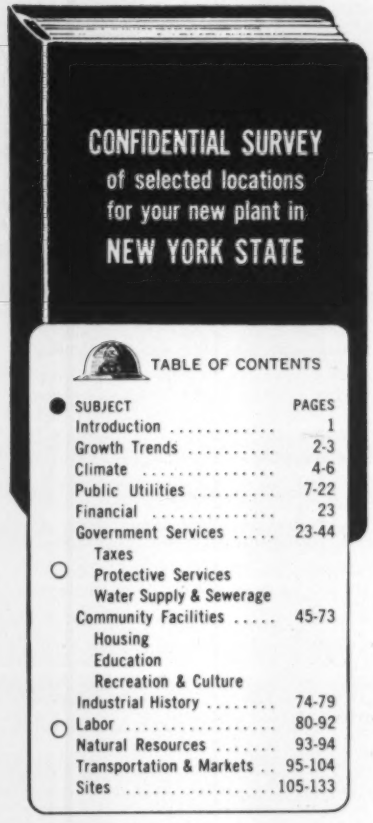
HYDRO-LINE

HYDRO-LINE CYLINDERS



5604 PIKE ROAD • ROCKFORD, ILLINOIS manufacturers of: high- and low-pressure hydraulic cylinders • heavy-duty air cylinders • adjustable-stroke cylinders • dispensing cylinders • intensifiers • single-acting cylinders • booster cylinders

FREE TO COMPANY OFFICIALS LOOKING FOR A NEW PLANT SITE



TAILOR-MADE REPORTS. The table of contents shown above is typical of the survey of selected plant locations that we will prepare for your organization. Simply send your specific requirements on your business letterhead to Commissioner Keith S. McHugh, New York State Department of Commerce, Room 4117, 112 State Street, Albany 7, N. Y.

Keith S. McHugh

Keith S. McHugh, Commissioner
New York State Department of Commerce

NEW Literature

Write directly to the company for a copy

Angular Contact Thrust Bearings

Advantages of angular contact thrust bearings in relieving mechanical stress and other design problems are discussed in a brochure. Aetna Ball & Roller Bearing Co., a division of Parkersburg-Aetna Corp, 4600 Schubert Ave., Chicago 39, Ill.

Choosing Shielding Gas

A handy, basic guide for the selection of the most efficient shielding gas is available from Air Reduction. Specify Form ADR 135. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Brazing Alloy Chart

AWS and AST&M designations and tradenames are listed in a brazing alloy comparison chart. Silver, copper, and brass-base alloys are also detailed. Technical Dept., American Brazing Alloys Corp., P. O. Box 11, Pelham, N. Y.

Opportunities in Canada

More than 150 profit opportunities in Canada's metalworking industry are pinpointed in a special, three part industrial survey. The report provides an analysis of how U. S. companies can establish manufacturing agreements with the more than 750 Canadian firms seeking such arrangements on a royalty or joint venture basis. Advantages include savings on customs duties, a readymade Canadian distribution setup in many cases, and a way into British and Commonwealth markets. Ontario Department of Commerce & Development, Box M, Suite 1307, 680 Fifth Ave., New York 19, N. Y.

Drill, Jig Bushing Chart

A four page conversion chart is designed to expedite the ordering of drilling jig bushings. It enables the conversion of symbol numbers for easy, accurate ordering. Also included are ASA standard symbol numbers. Acme Industrial Co., 200 N. Laflin Ave., Chicago, Ill.

Welding Symbols Chart

A welding symbols chart has been published by Lenco. The page is punched for notebook insertion. Lenco Inc., 350 W. Adams St., Jackson, Mo.

Manganese Steel Castings

Facts About Manganese Steel Castings, a 16 page booklet, is designed to help buyers make decisions. American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.

Acid Immersion Tin Plating

An acid immersion tin plating process that is said to produce a uniform, corrosion resistant, deposit of tin on copper, copper alloys, lead, tin-lead alloys, and solder is described in a technical data sheet, No. 131. MacDermid Inc., Waterbury 20, Conn.

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SIMONDS has seventy years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

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NEW BOOKS

Effective Marketing Co-ordination, edited by George L. Baker Jr., American Marketing Association, 27 E. Monroe St., Chicago 3, Ill., $7.50

Presented are the 67 speeches given at the 44th National Conference of the American Marketing Association. Emphasis is on co-ordinating the marketing function effectively. Included are speeches by such authorities as Chris J. Witting, vice president, Westinghouse Electric Corp.; Peter G. Peterson, president, Bell & Howell Inc., and Ernest Dichter, president, Institute for Motivational Research.

The 1961 Product Directory of the Refractories Industry in the United States, The Refractories Institute, First National Bank Bldg., Pittsburgh 22, Pa., 224 pages, $4.50

The directory lists 3548 brands of refractories, up 24 per cent from the number included in the previous directory (published in 1958). The 170 companies listed represent almost 100 per cent coverage of the more than $400 million annual sales volume of the industry. Sections are devoted to manufacturers' names and addresses, plant locations, product divisions, and a complete list of brands or tradenames.

Commercial Standard CS8-61, Gage Blanks, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 40 cents

American Gage Design Standards have been revised to include new data provided by industry. The standard primarily covers the designs and dimensions of unfinished blanks from which finished gages are made. The general use of uniform standard blanks offers many advantages over varying individual designs and the use of standard handles, frames, and fittings is considered advantageous. Designs and dimensions are detailed. Superseding the 1951 edition, the new standard includes data issued in the 1955 supplement together with new data authorized by the American Gage Design Committee. The publication was prepared by the U. S. Department of Commerce's Office of Technical Services.

Electromechanical Components for Servomechanisms, Sidney A. Davis, and Byron K. Ledgerwood, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36, N. Y., 334 pages, $11.50

The field of electromechanical devices for application to precision servomechanisms is surveyed. Advanced mathematics is avoided and clear understanding of the physical principles is emphasized. The material includes an introduction to rotating components, potentiometers, synchros, resolvers and induction potentiometers, tachometers, alternating current and direct current servomotors, and miscellaneous components. The book is aimed at the how-to approach with an explanation of physical principles and numerical examples to illustrate conclusions.

1961 *Book of AST&M Methods for Chemical Analysis of Metals—Committee E-3* American Society for Testing & Materials, 1916 Race St., Philadelphia 3, Pa., 722 pages, $11, ($8.80 to AST&M members)

This is an authoritative source of reliable and accurate methods of analysis and is supplemented by many testing procedures perfected and approved by Committee E-3. Among the topics covered are sampling methods, chemical analysis of ferrous and nonferrous metals, analysis of metal powders, and spectrochemical and microchemical analysis methods. Data on standard samples of metals issued by the National Bureau of Standards are also included.

Water Treatment for Industrial and Other Uses, Second Edition, Eskel Nordell, Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y., 598 pages, $12

The original book has been expanded to include advancements in water treatment and applications. Chemical reactions are both spelled out and shown in equation form. Two chapters have been added to cover commercial, institutional, and municipal water conditioning. The first four chapters cover water supplies, impurities, and the characteristics

compare

LIFT TRUCKS

Power and Performance

Allis-Chalmers' OWN — POWER-CRATER engine is engineered specifically for Allis-Chalmers lift trucks. Has unique crater-shaped combustion chamber that sets up violent swirling turbulence for thorough mixture of air and fuel, resulting in responsive power and maximum fuel economy.

Operator Effectiveness

Familiar, automotive-type controls — wide, adjustable seat — unobstructed floor — these and many other conveniences help operators work faster, safer.

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Service and maintenance in a minimum of time.

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ALLIS-CHALMERS . .

of the impurities. The balance of the book, contains a discussion of many water treatments for specific problems.

Guidelist for Marketing Research & Economic Forecasting, Research Study 50, Robert N. Carpenter, American Management Association Inc., 1515 Broadway, New York 36, N. Y., 94 pages, $3.75 ($2.50 to AMA members)

The intent of this research study is to give a broad outline of available publications and other sources of facts pertinent to marketing. Bibliographies and directories are emphasized.

Physical Examination of Metals, B. Chalmers and A. G. Quarrell, St. Martin's Press Inc., 175 Fifth Ave., New York 10, N. Y., 917 pages, $30

Most of the principal physical techniques for the examination of metals are covered. Included are optical methods, electrical measurements, thermal methods, magnetic analysis, x-ray diffraction, radiation methods, and ultrasonic flaw detection.

Cutting Tools, Jigs & Fixtures, H. C. Town, Macmillan Co., 60 Fifth Ave., New York 11, N. Y., 247 pages, $6

Part 1 deals with the basic features of tool design, including negative rake cutting in connection with the use of cemented carbide tools and the design of cutters for down-cut milling and square hole drilling. Heat treatment, tool grinding, cutting speeds, and feed rates are covered, and the chapter on cutting materials introduces such things as ceramics and diamond tools. Part 2 discusses the economics and design factors of jigs and fixtures, compares different machining methods, and gives a wide range of examples of machines and tooling equipment, pneumatic and hydraulic devices, and other special types of jigs and fixtures. Examples of design problems are included.

Directory of Steel Foundries, Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio. 270 pages, $15

The 1961-62 directory, published biennially, lists North American steel foundries, their officers and directors, types and sizes of castings produced, monthly capacities, processes employed, types of melting and heat treating equipment used, testing facilities, and number of employees. In addition to sections devoted to Canadian and Mexican facilities, foundries are indexed by states. The directory also contains a listing of officers, directors, and committees of the Steel Founders' Society.

Refractory Metals and Alloys, edited by N. Semchyshen and J. J. Harwood, Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y., 623 pages, $17.60 to AIME members ($22 to nonmembers)

The book, volume 11 of a conference series, presents the proceedings of a technical meeting held by the Metallurgical Society of the AIME. Subject: The advantages and disadvantages of the behavior and properties of the refractory metals as a group and as competitive materials. Contents are grouped under the headings of "General Metallurgy of Refractory Metals and Alloys," "Refractory Metals and Alloys," and "General Engineering of Refractory Metals." The meeting (May 25, 26, at Detroit) was sponsored by the Refractory Metals Committee of the society's Institute of Metals Division and the Detroit section of AIME.

Organizing for International Operations, Research Study 41, American Management Association, 1515 Broadway, New York 36, N. Y., $12

Definitive data on overseas organizational structures are presented. Included are more than 50 organization charts and summarized job descriptions. Surveyed are methods used by respresentative U. S. companies to build their branch structures overseas, as well as typical patterns of management control employed in international activities.

1960 *ASTM Proceedings, Volume* 60, American Society for Testing & Materials, 1916 Race St., Philadelphia 3, Pa. 1242 pages, $12 ($8 to AST&M members)

This is the official record of the proceedings of the society for the entire year. It records the technical accomplishments, including reports and papers, together with discussions, which were offered to the society during 1960 and accepted for publication. The summary of proceedings of the AST&M 63rd annual meeting (June, 1960) is included.

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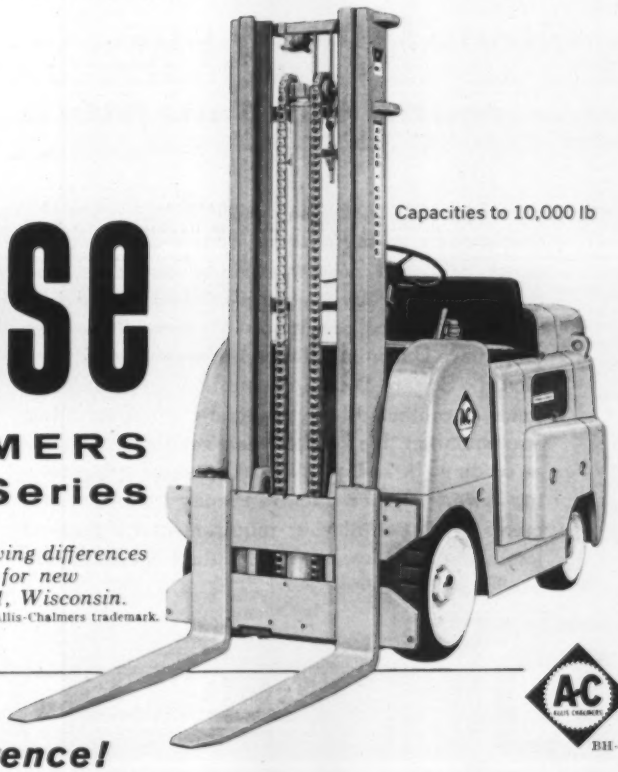

Have your dealer show you the many dollar-saving differences in Allis-Chalmers "F" Series lift trucks. Ask for new bulletin BU-680. Allis-Chalmers, Milwaukee 1, Wisconsin.

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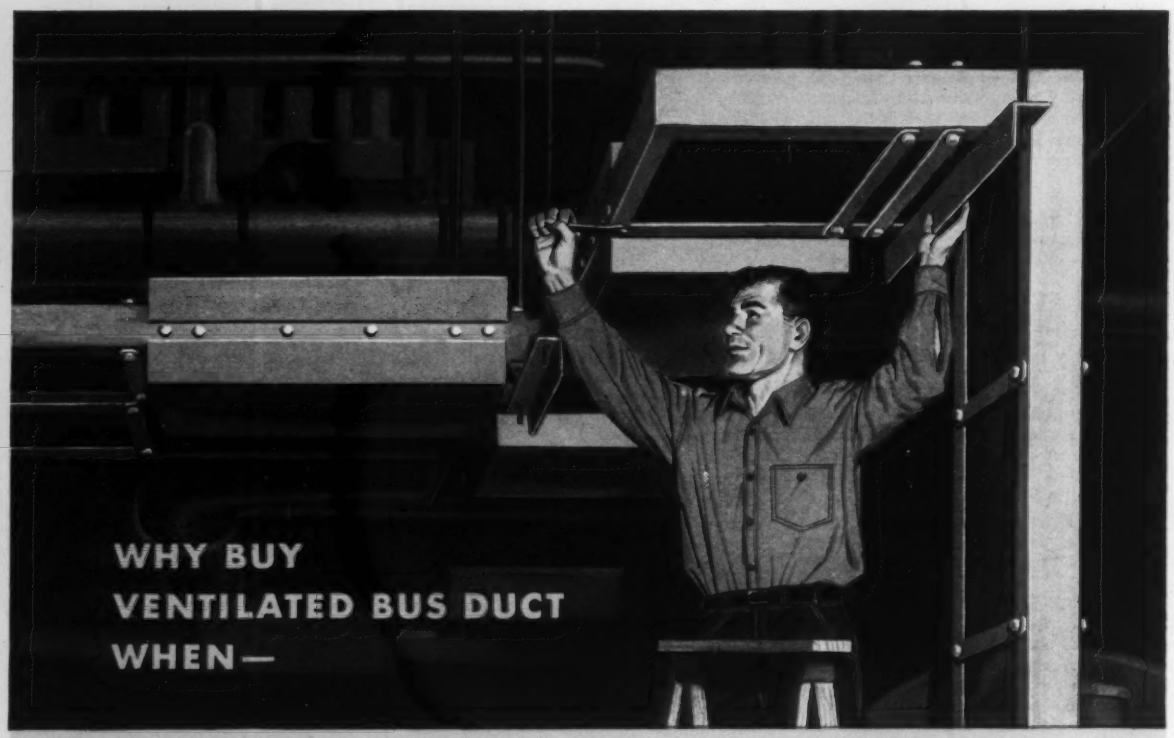

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mounts in any position without de-rating

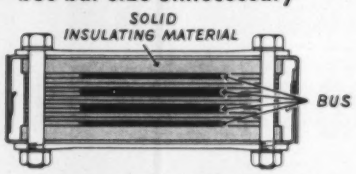
—and costs no more

*(low impedance)

Square D totally enclosed low-impedance bus duct mounts in any position without de-rating, because it doesn't need ventilation. Moreover, you can have all the advantages of totally enclosed duct without the price penalty of a "special," because all Square D low-impedance bus duct is totally enclosed. Square D feed-in duct has no ventilation holes, is protected from physical damage and dust accumulation. It's smaller than ventilated duct by as much as 50%. Doesn't it make sense, when buying low-impedance duct, to specify a product that meets every one of your requirements? Square D totally enclosed low-impedance duct costs no more —why settle for less?

Here's Why Square D's EXCLUSIVE Design

makes ventilation and increased bus bar size unnecessary



The entire space within the duct and between the bus bars is filled with a solid insulating material which conducts the heat to the surface. There are no dead air spaces inside the duct. Square D totally enclosed low-impedance duct meets U/L requirements for temperature rise with no larger bus bars (hence, no higher cost) than ventilated duct.

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Steel Inventories to Double

LOOK FOR steel users to double their inventories before June 30, when steel labor contracts expire.

The buildup is already underway. It started modestly last month when consumers increased their stocks enough to support gradually rising production schedules. At the end of October, inventories were about 400,000 tons higher than they were at the start. By the end of December, they'll be 700,000 to 900,000 tons higher than now.

During the fourth quarter, about 5 per cent of the steel that's shipped to users will go into stockpiles. At yearend, the level of consumer inventories will be about 11.5 million tons—a two month supply in terms of projected first quarter consumption.

BUILDUP TO ACCELERATE— After the first of the year, users will start building inventories in earnest. In the first quarter, up to 17 per cent of domestic steel shipments will go into consumer stockpiles—boosting them by almost 4 million tons. On Mar. 31, the inventory level will be equivalent to a 70 day supply.

In the second quarter, about 20 per cent of domestic steel shipments will go into storage. Inventories will increase by 5 million tons. By June 30, they'll top out at 20 million tons—more than three months' supply if perfectly balanced.

LESS THAN IN 1959— Although the first half buildup will be almost as large as the one that occurred in the like period of 1959 (when buyers last hedged against a threatened strike), the June 30 inventory level will be substantially lower than it was three years earlier. Reason: Inventories were about 5 million tons higher at the start of 1959 than they'll be at the start of 1962. Users won't be as well prepared next year to ride out a long strike as they were in 1959, but many of them are betting that the administration won't tolerate a deadlock like the last one.

For steelmakers, there's a silver lining: If there's no strike or only a short one, they won't have to wait so long for customers to digest their inventories and start placing new orders.

AUTOMAKERS PLAN BUILDUPS— Although automakers are laying the groundwork for inventory building programs, they probably won't start adding to their stocks until after the first of the year. Reasons: 1. They want to minimize their liability to yearend property taxes that are levied in Detroit and elsewhere. 2. They want to get a better fix on new car sales and a clearer view of the steel labor situation before committing themselves.

The 15 per cent increase in car assemblies scheduled for November (640,000 vs. 557,000 in October) hasn't had much impact on the steel market. Automakers will take about the same tonnage this month as they did in October and meet their increased requirements by drawing on inventories accumulated during the strikes.

TIN PLATE SETS RECORD— Shipments of electrolytic tin plate in the first nine months of the year set a record for the period: 4,296,538 net tons. September shipments of all finished products from mills were 6,057,705 net tons. Nine month total: 48.5 million tons (vs. 57.6 million tons in the like period of 1960).

PRODUCTION ON PLATEAU— Look for ingot production in the week ending Nov. 18 to be about the same as the 2,044,000 tons that STEEL estimates the industry poured in the week ended Nov. 11. Output then was unchanged from the previous week's.

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Service Center Prices Firming Up

PRICE FIGHTING knocked much of the profit out of steel distribution by service centers in the first nine months of 1961, but a turn for the better is noted as the fourth quarter advances. Distributors report a definite firming of the price structure and improved sales prospects for the first quarter of 1962.

Current volume is good. October was one of the year's better volume months, though it fell short of expectations. Trading in November and December will suffer because of fewer working days and holiday influences.

An over-all gain of 5 to 10 per cent in volume is predicted for first quarter, 1962.

• **Demand Disappointing** — Order volume has been only so-so throughout 1961, tonnagewise just about equaling that in 1960. Expected active buying failed to materialize, partly because consumers could get quick mill shipments (within two to three weeks). That meant much fill-in and emergency buying (mainstay of service center business) was lacking.

Dollarwise, 1961 business will fall below year-ago levels for most distributors. Prices have been highly unstable all year long, due mainly to stiff competition among the service centers. At some points, continued heavy imports have also been a factor.

• **Price Shading**—Competition for business has been so keen it has given rise to much price shading through the waiving of extras and upgrading of various items. Offerings of galvanized sheet seconds and concessions on production grades of cold rolled sheets have been disturbing influences. The pricing situation in stainless sheets has been little short of chaotic.

Pricing is showing signs of straightening out. Even the acute situation in stainless sheets seems headed for correction. Last week, an important Midwest seller restored quantity extras that had been eliminated last July. That action will add something like $25 a ton to the seller's net return. Other leading service centers indicate they'll take similar action.

• **Difficult Position** — Distributors generally feel that mill price increases in the near future would be hard to pass along to customers. Demand, they say, isn't strong enough to force a substantial exten-

sion of mill deliveries needed to divert quick shipment tonnage to service centers, and thus tighten supply conditions at that market level. Mill deliveries of some products are becoming a little more extended, but not enough to indicate a real turn is developing in the market.

Right now, general line service centers and those specializing in structurals and plates, report order volume is only a little better than it was a year ago. In fact, a seasonal slacking in the heavier products is gaining momentum. On the other hand, specialty houses (such as those handling tool steel and tooling plates) report a seasonal pickup in demand as 1963 auto tooling programs begin to break. Service center business generally should rise as automotive suppliers get more orders for production parts.

• **Intake Moderate**—Mill shipments to the service centers this year will account for about 18.5 per cent of all the finished steel moved in 1961. Distributor intake this year so far has averaged a little under 1 million tons monthly vs. a little more than 1 million tons in 1960.

The service centers started to rebuild their depleted stocks right after the 1959 steel strike. During the last half of 1960, restocking slowed down, the slowdown continuing into the early part of this year. In March, intake began to rise again, continuing upward through May. In June, there was a slight dropoff, followed by a July upturn, the movement hitting a peak for the first eight months in August at 1,138,267 tons.

• **Stocks Are Up**—Service center stocks of finished steel products (as of Nov. 1) are estimated at 3.2 million net tons, up about 400,000 since the start of this year (see chart). Further accretion of possibly 5 per cent or so is expected the next couple of months, so that yearend inventories may total a little more than 3.3 million tons. The high point of steel service center inventories was 3.7 million tons at the start of 1958.

R. G. Welch, executive vice president, Steel Service Center Institute, says West Coast distributors report relatively strong business, complicated in some areas by wage disputes. They expect 1962 business will about equal 1961 volume. Increased military expenditures are only now getting to the contractor and subcontractor levels.

• **Improvement Noted**—Midwestern distributors, says Mr. Welch, report improved business in recent weeks, but uncertainties in the auto industry and area wage disputes at Buffalo and Cleveland combined to keep October shipments under expectations.

Reports from New England and New York indicate shipments by the distributors have increased moderately in recent weeks, and sellers think the pickup will continue through the remainder of this year and into 1962.

Service Centers Move to Firm Up Stainless Prices

Strengthening of stainless sheet prices by steel service centers appears to be underway. Following announcement by Chicago Steel

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Service Co., Chicago, that it was lowering its discount to 5 per cent from the 7.5 per cent quoted since last July, several other Midwestern service centers indicated they would take similar action.

The move is in the direction of restoring prices to previously quoted levels. Some sellers say the action will add as much as $25 a ton to the net return of sellers.

The service center market situation in stainless sheets has been in a turmoil since last July when it looked like the 10 per cent functional discount allowed by the mills to warehouse suppliers was about to disappear. It did get down to a point where the service centers were working on a margin of about 2.5 per cent.

Several weeks ago, the Warehouse Div. of Jessop Steel Co. started the move toward firming up the market by removing all discounts on stainless sheets, returning to price levels quoted prior to the severe price cutting.

Competition from Foreign Steel Unchecked on Coast

Imports of steel on the West Coast continue to hold down domestic steel production in the area. Prospects for a 1962 easing in the competitive situation are not considered bright.

Area steelmen say imports tend to rise prior to the termination of the domestic industry's labor contract. The present contract is scheduled to expire in June.

Speculation heard at Houston: Significantly lower prices for foreign steel may be quoted before the end of the year. Factors cited: West European mills are reported to have considerable unbooked capacity, and are facing a normal winter slowdown in construction on the continent.

Wire . . .

Wire Prices, Pages 225 & 226

Specifications for manufacturers' wire are reported a shade more active than they were a few weeks back. Delivery promises still range one to five weeks, depending upon the processing required. Demand for wire specialties is holding up better than that for the plain carbon grades. Oil tempered wire is moving at a steady pace, with consumers ordering close to their requirements.

Wire used for reinforcing in prestressed structures is in good demand —estimated tonnage so far this year is at least 5 per cent above that in 1960. Cold heading grades of wire also are fairly active, with shipments generally specified before yearend.

There's not much change in the merchant wire trade. Deliveries are available from stock in some cases—in two to three weeks at latest. Some makers report stronger demand for nails, still restricted by heavy imports.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 224 & 225

Although autobuilders are planning to build 640,000 cars this month vs. 557,000 in October, they're not increasing their sheet and strip purchases. They'll buy

nothing tricky about it!

METAL BLAST simply has a new and much more economical process for making steel shot and grit! This is an entirely new and different manufacturing process and we have applied for a patent on it.

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about the same tonnage for November as they ordered in October, meeting increased requirements from inventories built up during the strikes.

Prospects for December are clouded, but most observers expect demand to hold. Some mills see no change in the level of automotive needs; others think the car builders will step up their purchases 10 to 12 per cent. There are few signs of any inventory buildup, but there's abundant evidence of growing concern about deliveries. Buyers will protect themselves against the possibility of strike-induced shortages next July. The big buildup of stocks will probably start in February.

Galvanized sheet deliveries are easier seasonally. Maximum promises range around mid-December. Hot carbon sheets can be had within two to three weeks, cold rolled in three to five weeks.

Steel Bars . . .

Bar Prices, Page 223

Automotive specifications have picked up a little, but over-all demand for steel bars is little changed. Distributors are not seeking much new tonnage, and machinery and industrial equipment builders are not buying actively. There's little change in requirements of the fastener makers. Mounting demand for small arms is stimulating demand for bars in New England.

Demand for alloy bars has been on the upswing since mid-October, largely reflecting automotive buying.

October bookings were close to the top for the year, and November shipments may be 8 to 10 per cent higher than last month's. Deliveries continue prompt, so there's little incentive for users to build inventories.

Delivery promises on hot rolled carbon bars still range two to four weeks, on cold drawn carbon, two to three weeks.

Tubular Goods . . .

Tubular Goods Prices, Page 227

A more or less flat line has replaced the sales curve for oil country goods. Last month's bookings bettered September's but were less than August's. For the last five or six weeks, the order trend has been sidewise. Producers are shipping at 60 to 70 per cent of capacity. Shipments in November and December are expected to continue at the October rate. Users are buying only for immediate needs, but are beginning to talk about inventory building for strike protection.

Rotary oil drilling in the U. S. is holding well above the year-ago level. Hughes Tool Co. reports 1820 active rigs in the U. S. during the week ended Oct. 30, up 4 for the week and 117 more than a year ago. Unfavorable weather slowed Canadian operations, 145 rigs being engaged vs. 156 a week earlier. A year ago, 143 rigs were operating.

Plates . . .

Plate Prices, Page 223

While reports from the East indicate demand is little improved compared with that of two or three weeks ago, Chicago area sellers say bookings are better than had been expected. Southern producers indicate deliveries have been extended from 30 days to 45 days. The extension is due largely to delays in

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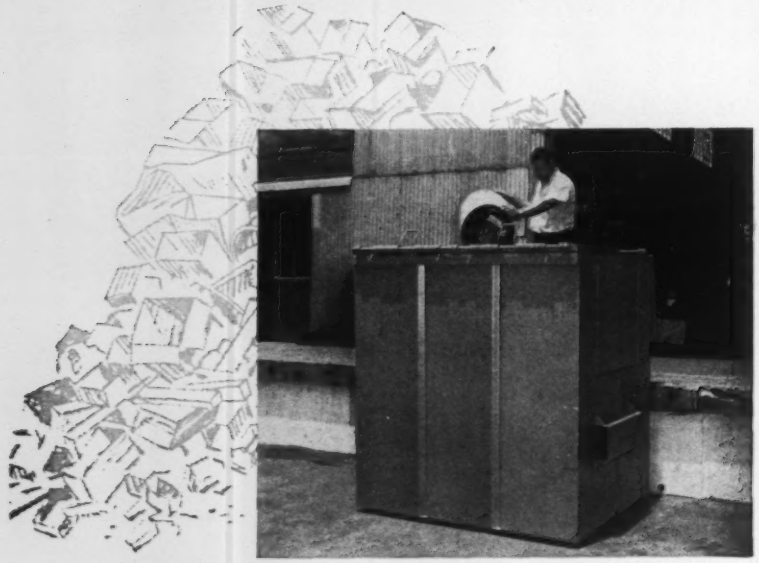

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getting a new plate mill into smooth production.

Sheared carbon plates can still be ordered for delivery in two to three weeks, and universal plates in ten days to two weeks. Shipments of alloy plates are available in around five weeks.

Two major oil companies are planning a refinery and tank farm in Alaska. A. F. Robinson Boiler Works, Cambridge, Mass., and Parsons Equipment Co., Willoughby, Ohio, have been awarded subcontracts for heavy plate fabrication and machining by the Naval Shipyard at Portsmouth, N. H.

Structural Shapes . . .

Structural Shape Prices, Page 223

Less fabricated structural steel tonnage is being estimated as building slows down seasonally. Bridges, schools, and other public work account for a large part of current volume. Highway work continues active at most points.

Prices on structural steel in place are slightly firmer, but competition among fabricators continues keen.

Orders placed with the steel mills for plain material closely parallel firm fabricating contracts, and no inventory buildups of steel are in prospect over the rest of this year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2600 tons, superstructure for a 12 lane fixed bridge over South Expressway near Halsted St. and Archer Ave., Chicago, city of Chicago, to American Bridge Div., Pittsburgh, U. S. Steel Corp.

375 tons, Catholic school, Camden, N. J., to the Belmont Iron Works, Eddystone, Pa.

322 tons, bridge, Route No. 2, project UI 42-40-Sec. 1 HF, Winnebago County, Illinois, for the state, to Vierling Steel Works, Chicago.

182 tons, First Methodist Church, LaGrange, Ill., to Vierling Steel Works, Chicago.

150 tons, addition to Homewood-Flossmoor high school, Flossmoor, Ill., to Vierling Steel Works, Chicago.

STRUCTURAL STEEL PENDING

9138 tons, transmission towers, Trinity River Div., Central Valley project, California; bids Dec. 5. U. S. Bureau of Reclamation, Red Bluff, Calif.

3450 tons, state bridgework, Route 3 (1959) Sec. IC, Bergen County, New Jersey; bids Nov. 29; also, 565 tons of reinforcing steel required.

690 tons, pharmaceutical building, Merck, Sharp & Dohme, West Point, Pa.; bids being asked by Barclay, White & Co., Philadelphia, general contractor.

200 tons, Cougar Dam powerhouse, Oregon; rebids to the U. S. Engineer, Portland, Oreg., Dec. 1.

192 tons, state bridgework, Adams County, Pennsylvania; Burkholder & Burkholder, Winchester, Va., low on the general contract.

125 tons, I-beams, Military Industrial Supply Agency, Navy; bids Nov. 13, Philadelphia.

65 tons, three schedules, tower steel; Cramer & Dunlap, Tulsa, Okla., low at $27,236 to the Bonneville Power Administration.

60 tons, false roof and assemblies, Rock Island Dam, Columbia River; Pybus Steel Co., Wenatchee, Wash., low at $16,047 to Chelan County PUD No. 1, Wenatchee.

Unstated, 110 by 194 ft technical service center building, steel frame, Idaho Falls, Idaho; $1 million project; bids to the Atomic Energy Commission will be taken in late November.

Unstated, hangar doors, Boeing Field, Seattle; bids in.

Unstated, hangar and shop building, Boeing Field, Seattle; rebids Nov. 17.

REINFORCING BARS . . .

REINFORCING BARS PLACED

7500 tons, freeway section, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; general contract to Guy F. Atkinson Co., low at $7,944,493 by Washington State Highway Commission.

250 tons, 2000 ft, 120 in. diameter sewer pipe for Metro Renton treatment plant project, Seattle, to Concrete Conduit Co., Seattle.

150 tons, two Washington State spans, Pierce County, to J. D. English Steel Co., Tacoma, Wash.; Woodworth & Co., Tacoma, general contractor.

126 tons, jail, Atlantic County, New Jersey, through Anthony P. Miller, general contractor, to United Steel Products Co., Trenton, N. J.

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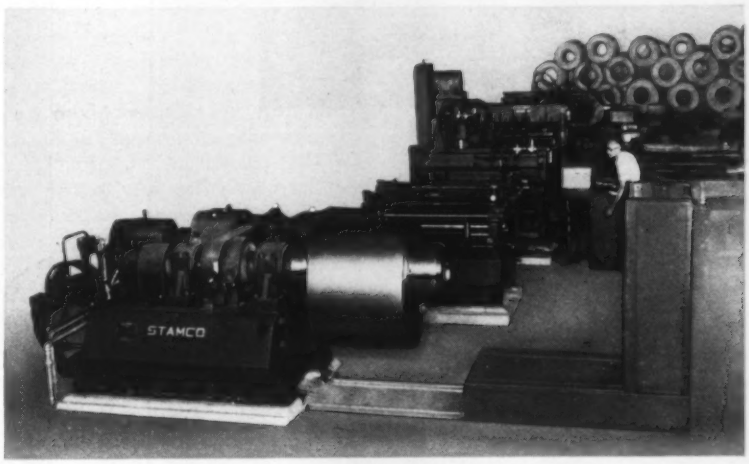

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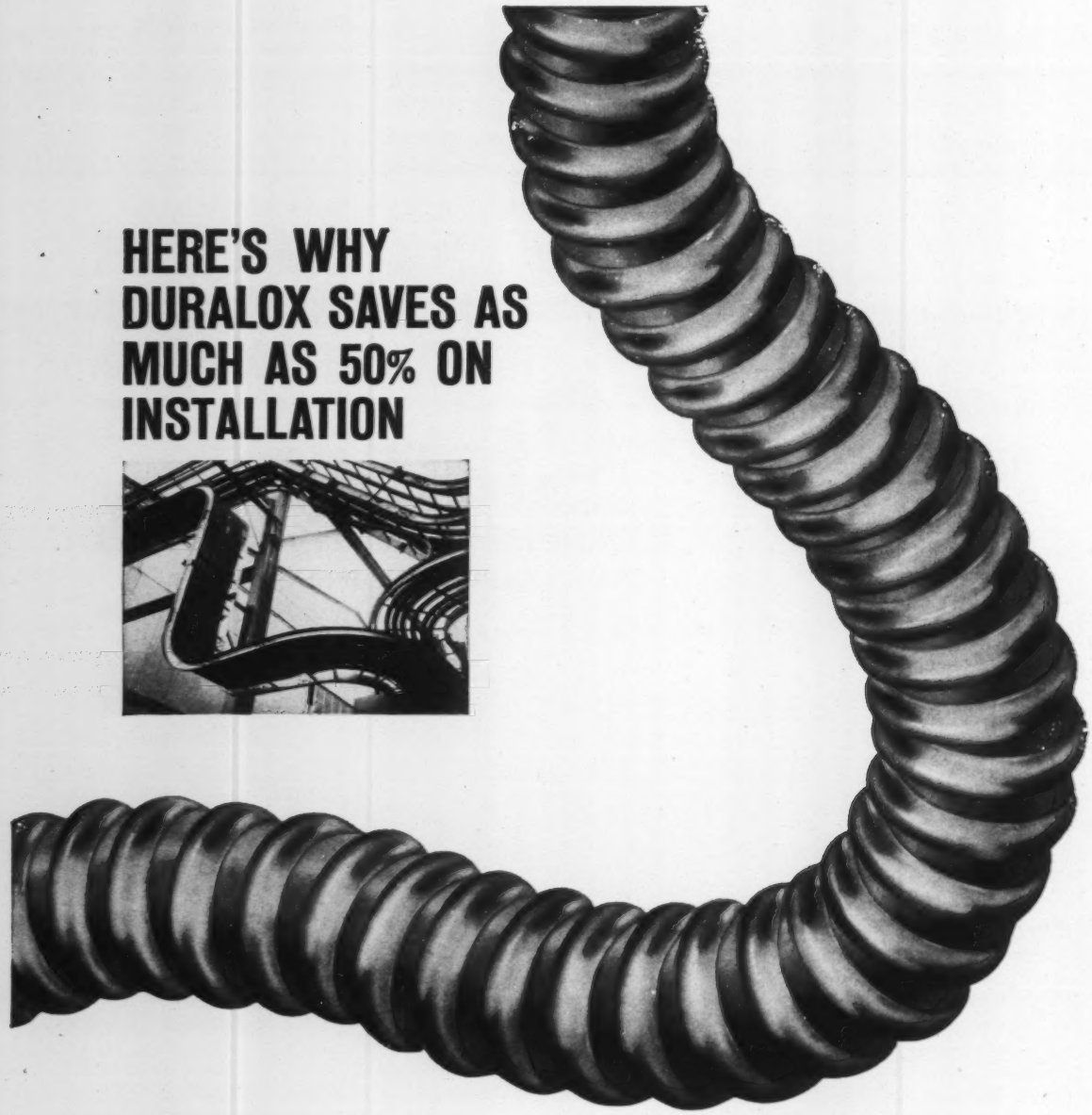

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103 tons, classroom, Western Washington College, Bellingham, Wash., to Pacific Coast Div., Seattle, Bethlehem Steel Co.; Newland Construction Co., Everett, Wash., general contractor at $465,775.

100 tons, Washington State overpass, Snohomish County, to Northwest Steel Rolling Mills Inc., Seattle; Dale M. Madden Construction Co., Seattle, general contractor at $179,178.

100 tons, Washington State bridge, King County, to Northwest Steel Rolling Mills Inc., Seattle; Northwest Construction Co., Seattle, general contractor.

100 tons, Deaconess Hospital, Wenatchee, Wash., to Pacific Coast Div., Seattle, Bethlehem Steel Co.; Cusick's Inc., Wenatchee, general contractor at $577,907.

REINFORCING BARS PENDING

565 tons, state bridgework, Route 3 (1959) Sec IC, Bergen County, New Jersey, bids Nov. 29; also, 3450 tons of structural steel required.

355 tons, Idaho State, six traffic structures, Bonneville County; Max A. Boesiger Inc., Mountain Home, Idaho, low at $949,007.

175 tons, flood-control project, Palouse River; also pipe and fittings; bids to U. S. Engineer, Walla Walla, Wash., about Dec. 19.

135 tons, Washington State, Evergreen Point bridge approach; bids to Olympia, Wash., Nov. 21.

110 tons, Idaho State underpass, Oneida County; bids to Boise, Idaho, Nov. 28.

110 tons, Washington State overpass, etc., Grant County; bids to Olympia, Wash., Nov. 21.

109 tons, Washington State, two girder spans, Whatcom County; bids to Olympia, Wash., Nov. 21.

PLATES . . .

PLATES PLACED

264 tons, carbon, Navy, Military Industrial Supply Agency, Philadelphia, to Alan Wood Steel Co., Conshohocken, Pa.; 688 tons, alloy plates to the U. S. Steel Corp., Pittsburgh.

218 tons, carbon, Navy, Military Industrial Supply Agency, Philadelphia, to Columbia-Geneva Steel Div., U. S. Steel Corp., Pittsburgh.

PLATES PENDING

4000 tons, including shapes, Monumental Dam powerhouse, Columbia River; bids soon to U. S. Engineer, Walla Walla, Wash.

4000 tons, 5 miles of pipe, Packwood power project, Washington State; bids Nov. 17; (if steel, alternative bids invited).

3500 tons, 66 in. diameter Toit River-Lake Forest connection; bids to Seattle in near future.

100 tons, 800 ft, 42 in. reservoir outlet; American Pipe & Construction Co., Portland, Oreg., low at $30,917 to Tacoma, Wash.

100 tons, water storage tank; bids in to Junction City, Oreg.

100 tons or more, six, 65 ft steel hull tugboats, U. S. Coast Guard, Washington, to Barbour Boat Works Inc., New Bern, N. C.

PIPE . . .

CAST IRON PIPE PENDING

133 tons, 6 and 8 in., for Othello, Wash.; bids in.

91 tons, 6, 8, and 12 in., for Tacoma, Wash.; bids Nov. 6.

RAILS, CARS . . .

RAILROAD CARS PLACED

Great Northern, 20 covered hoppercars, to General American Transportation Co., Chicago; also, this road has authorized its subsidiary, Western Fruit Express, to acquire 35 insulated boxcars and 10 refrigerated trailers.

RAILROAD CARS PENDING

Louisville & Nashville, fifty, 40 ft, van type trailers for piggyback service; bids asked.

Philadelphia Passenger Service Improvement Corp., 36 stainless steel passenger cars awarded tentatively to the Budd Co., Philadelphia, 24 contingent on completion of leasing arrangements with the Pennsylvania and Reading railroads, and 12 awaiting completion of financing arrangements under the 1961 Housing Act's urban transportation provisions.

Circuit Breakers Raised

Switchgear Div., Philadelphia, I-T-E Circuit Breaker Co., increased prices about 6 per cent on its line of low voltage, air circuit breakers. It was the first increase on the line since 1956. Prices were lowered in 1951 and in early 1961. Since the first of this year, low voltage, air circuit breakers have been selling at prices equivalent to those in effect prior to 1956.

U. S. Pipe Broadens Field

U. S. Pipe & Foundry Co., Birmingham, purchased the Soil Pipe Div. of Combustion Engineering Inc., Chattanooga, Tenn., and T. C. King Pipe & Foundry Co., Anniston, Ala. The Chattanooga plant has an annual capacity of about 120,000 tons of cast iron soil pipe and fittings for residential and commercial use. The plant produces soil pipe by centrifugal casting.

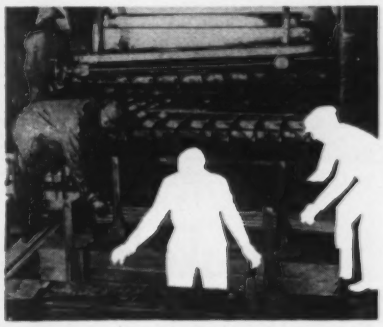
The two purchases mark the entry of U. S. Pipe into soil pipe production for residential and commercial building, and the product complements its present line of pressure pipe used mainly in the transmission of water and gas.

Nine Month Record Set For Tin Plate Shipments

Shipments of electrolytic tin plate set a nine month record at 4,296,538 net tons from January through September, reports the American Iron & Steel Institute. The former nine month high of 4,279,724 net tons was reached last year. The new figure is greater than the tonnage shipped in any full year prior to 1955.

Shipments of finished steel products from the mills in the first three quarters of this year totaled 48,544,475 net tons vs. 57,612,825 in the same period last year. Principal products: Cold rolled sheets, 8,555,037 tons; hot rolled sheets, 5,056,-

USING FRIED EQUIPMENT



1 man does the work of 3!

CUTS AND STACKS 40% MORE SHEET METAL THAN A SHEAR OPERATOR WORKING WITH 2 HELPERS

A. R. PURDY CO., metal warehouse, found their operator, working with 2 back-of-shear assistants, could not keep pace with their shear's 60-strokes-a-minute output. Then they installed a FRIED Liftveyor and Stripveyor . . .

"Production increased to the shear maximum," says a Purdy official. "Equally important, the cost of 2 helpers on each of 3 shears was eliminated!"

Other advantages of the FRIED Liftveyor:

1. Pneumatically operated plungers support all types of metals, all sheet and plate widths, against flexing.
2. Shearing is kept accurate to within .005".
3. Downtime caused by accumulations behind the shear is eliminated.
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Discover how FRIED plate, sheet and strip handling equipment can help your production and cut your operating costs. For free illustrated catalog, *act now.*

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Please send me free illustrated material containing full information on your automatic sheet, plate and strip handling equipment.

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493; hot rolled bars, 4,600,818; electrolytic tin plate, 4,296,538.

Shipments of galvanized sheets at 2,455,841 net tons were the second highest on record for the nine month period and were exceeded only by the 2,483,713 tons shipped in the first three quarters of last year. Also, shipments of concrete reinforcing bars were at a high level, totaling 1,864,203 tons.

Market classifications receiving the principal amounts of finished products in the nine months: Warehouses, 9,072,994 tons; automotive, 8,734,994; construction, 7,074,414; containers, 5,298,026; machinery, etc., 2,718,199.

Steelmaking Rate Holds Steady

STEEL ingot operations held unchanged at an estimated 2,044,000 tons for the week ended Nov. 11. Tonnage has fluctuated within a narrow range during the last five weeks, having reached a high of 2,071,000 tons for the week ended Oct. 14 and a low of 2,042,000 tons for the week ended Oct. 21. No substantial change is expected over the balance of the month.

• **Pittsburgh**—Steel production held at an estimated 71 per cent of 1960 capacity for the week ended Nov. 11. Output in the week ended Nov. 4 was 419,691 tons, or about 4000 tons less than the previous week's production. Steelmakers curtailed their output slightly to balance semifinished inventories with shipments.

• **Youngstown** — The steelmaking rate remained around 61 per cent of 1960 capacity during the week ended Nov. 11. Reporting somewhat better flat rolled business, including some automotive orders, Youngstown Sheet & Tube Co. added an open hearth at its Brier Hill Works. Sharon Steel Corp. and Republic Steel Corp. each took off an open hearth in this district, but Republic started up its bessemer converters for a five turn operation. They had been down the previous two weeks.

• **Chicago**—Steelmaking operations rose 1 point during the week ended Nov. 11 to 74 per cent of 1960 capacity. A few mills boosted activity slightly, while others reduced output to gear it to finished product shipments.

• **Buffalo**—Steel mills in this district continue to operate near 56 per cent of 1960 capacity. Bethlehem Steel is working 19 of 35 open hearths; Republic, four of nine; and Wickwire Spencer, one of three. Mill executives look for a little better demand for automobile steel this month, but it will be offset by seasonal declines in buying by certain other large consumers.

• **Philadelphia**—A slight rebound in steel output in the Northeastern district was indicated for the week ended Nov. 11. In the preceding week, the AISI index dropped 3 points to 108.

• **Detroit** — Production here continued at about 142,687 tons during the week ended Nov. 11. Despite reports of heavier orders from automakers, mills have not boosted production schedules. Yearend prospects and inventory taxes in the Detroit area will force mills to hold output down so inventories won't pile up.

• **Birmingham** — The steelmaking rate for the Birmingham-Gadsden-Atlanta areas of the Southern district dropped 8 points to 64.5 per cent of 1960 capacity for the week ended Nov. 11 as two major steel producers curtailed operations.

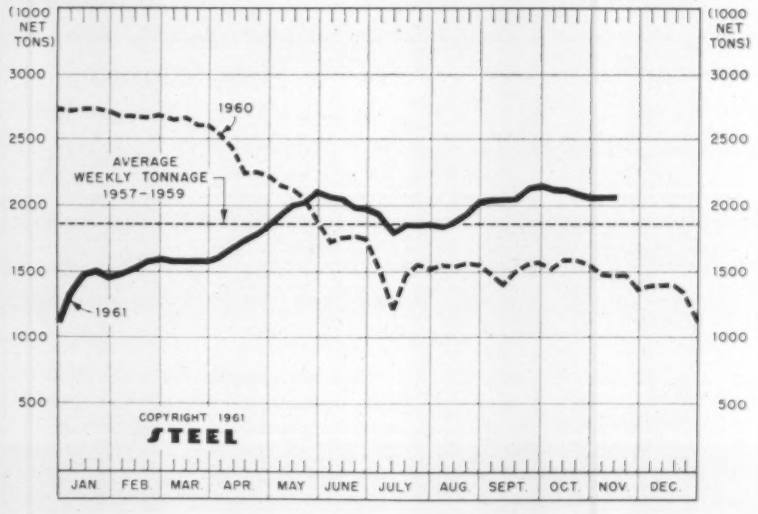
• **Cincinnati** — Ingot production dropped slightly during the week ended Nov. 11. The rate was about 81 per cent of 1960 capacity. The slight drop is attributable to a decline in orders.

STEEL INGOT PRODUCTION

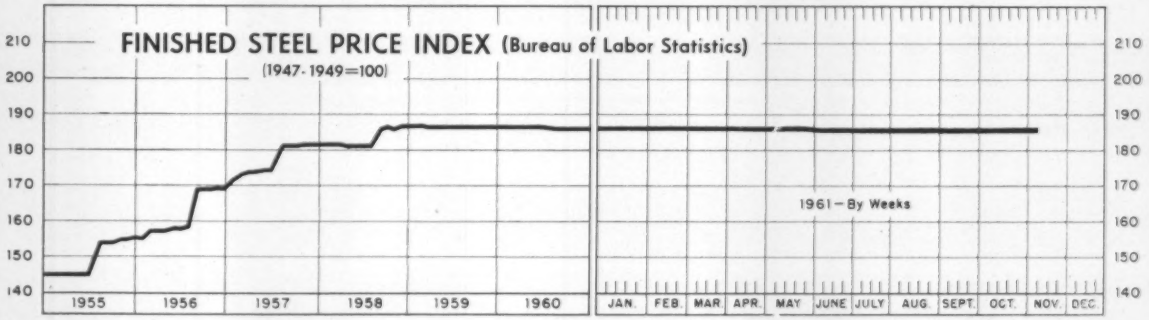
Weeks Ended	Net Tons	Change
Nov. 11	2,044,000*	0
Nov. 4	2,044,000	— 0.6%
Oct. 28	2,057,000	+ 0.7%
Totals to Nov. 4		
1961	80,765,000	— 7.7%
1960	87,504,000	

DISTRICTS	Week Ended Nov. 4 Tons‡	Week Ended Nov. 4 Index†	Week Ended Oct. 28 Index†
Northeastern	288,572	108	111
Buffalo	98,329	101	101
Pittsburgh	419,691	104	105
Youngstown	159,782	94	98
Cleveland	111,114	120	115
Detroit	142,687	136	133
Chicago	411,483	110	110
Cincinnati	100,289	133	127
St. Louis	67,264	128	127
Southern	109,480	101	101
Western	135,619	116	121
Industry	2,044,000	109.7	110.4

*Estimated by STEEL
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Nov. 7, 1961	Week Ago	Month Ago	Oct. Index	Year Ago
185.4	185.4	185.4	185.4	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 7

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	(N.A.)
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv. Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.423
		Casing, Oil Well, Carbon (100 ft)	193.028
		Casing, Oil Well, Alloy (100 ft)	302.645
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	192.285
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, 8d Common (50 lb)	4.715
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Nov. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	225.58
Index in cents per lb	6.713	6.713	6.713	6.713	6.111

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$137.66
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	62.63
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	62.18
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	63.41
Steelmaking Scrap, GT	33.00	34.67	39.17	28.83	59.17

Comparison of Prices

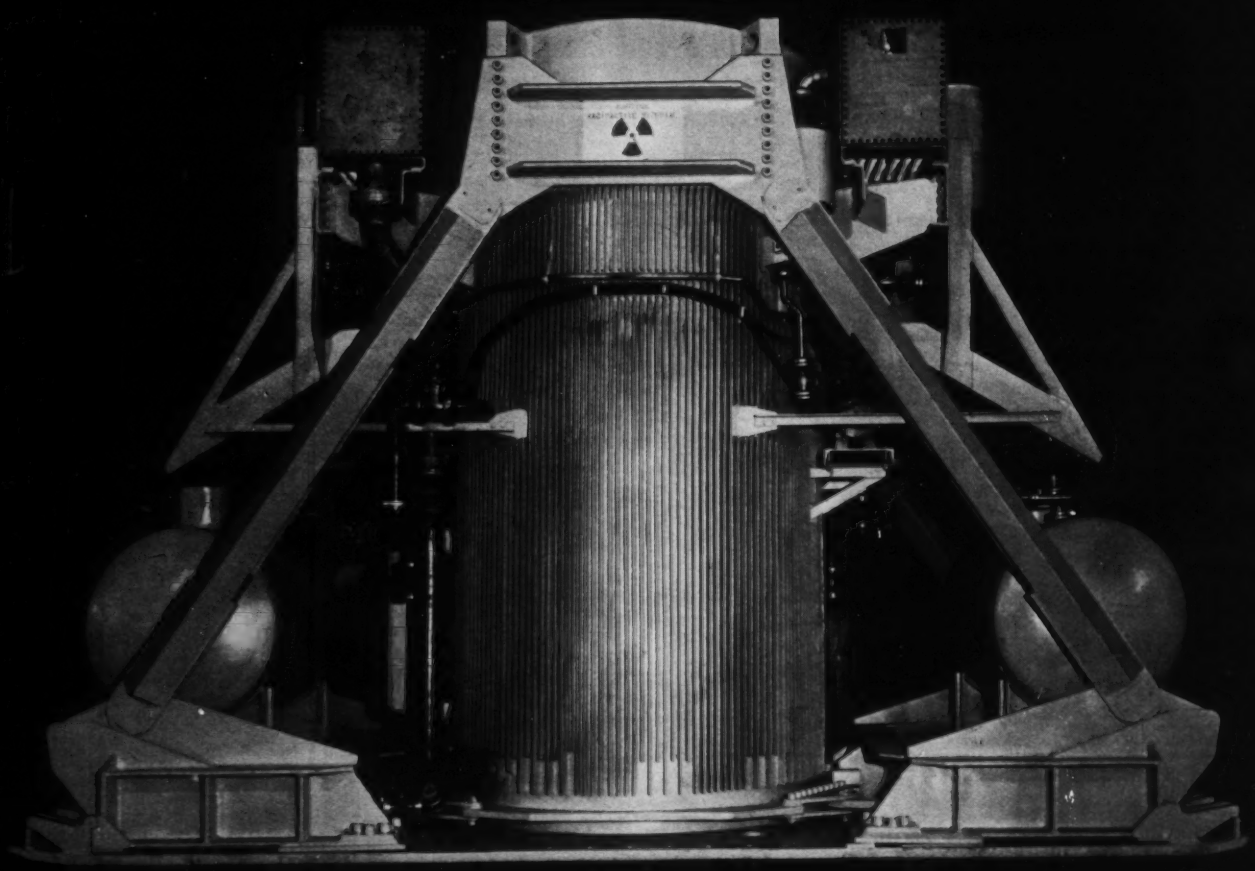
Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	5.075
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	5.075
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.98	5.35
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.85
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	5.00
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	5.00
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.745	5.40
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.85
Plates, Chicago	5.30	5.30	5.30	5.30	4.85
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	5.25
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.85
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.75-5.85
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	6.30
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.95
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	7.20
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	8.20
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$91.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.80

PIG IRON, Gross Ton	Nov. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$63.50
Basic, Valley	66.00	66.00	66.00	66.00	62.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.18	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.68	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	59.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	66.70
Malleable, Valley	66.50	66.50	66.50	66.50	63.00
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	235.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$33.50	$33.50	$37.50	$26.50	$58.50
No. 1 Heavy Melt, E. Pa.	34.00	39.00	40.50	34.00	58.00
No. 1 Heavy Melt, Chicago	31.50	31.50	39.50	26.00	61.00
No. 1 Heavy Melt, Valley	36.50	36.50	39.50	26.50	66.50
No. 1 Heavy Melt, Cleve.	32.50	32.50	36.50	23.50	65.00
No. 1 Heavy Melt, Buffalo	29.50	31.50	32.50	23.50	57.50
Rails, Rerolling, Chicago	57.50	57.50	60.50	46.50	87.50
No. 1 Cast, Chicago	39.50	39.50	42.50	36.50	50.50
COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.50
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	17.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	29.50



for safety's sake there's Carlson Stainless Plate in this Spent Fuel Shipping Cask

One of a group of Spent Fuel Shipping Casks designed and fabricated by Knapp Mills Incorporated for General Electric Company.

Photo courtesy of Knapp Mills Incorporated.

Spent atomic fuel is "down but not out." Containing unused uranium, it still must be handled safely and surely in being moved by rail, boat, or truck to recovery stations throughout the country.

Carlson Type 304 stainless steel plate was used in various parts of these shipping casks. Designed and fabricated by Knapp Mills Incorporated of Wilmington, Delaware, each cask weighs approximately 125 tons.

For maximum assurance—whether you build chemical, process, nuclear, missile, or aircraft equipment—specify dependable Carlson stainless steel plate. Specialists produce the material to meet your exact specifications. Your fabrication is easier—true-up and finish-welding is done quickly and efficiently. This, plus prompt delivery, is the total Carlson service you can count on—write, wire or phone today for complete information and assistance.

G.O.CARLSON *Inc.*

Producers of Stainless Steel

122 Marshallton Road
THORNDALE, PENNSYLVANIA
District Sales Offices in Principal Cities

Plates • Plate Products • Heads • Rings • Circles • Flanges • Forgings • Bars and Sheets (No. 1 Finish)

Steel Prices

Mill base prices reported to STEEL, Nov. 8, cents per pound except as otherwise noted. Code number following mill point indicates producing company. Key to producers, page 224; footnotes, page 226. *Changes shown in italics.*

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOT, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S33 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)
Bartonville,Ill. K4 .... $80.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 .... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 .. 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 .. 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 .. 99.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 .... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 .. 99.50
LosAngeles B3 ..... 109 00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. C8 .... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 .. 99.50
S.Duquesne,Pa. U5 .... 99.50
S.SanFrancisco B3 .... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 .... $119.00
Bridgeport,Conn. C32 .. 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 .... 119.00
Conshohocken,Pa. A3 .. 121.00
Detroit S41 ..... 119.00
Economy,Pa. B14 .... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 .... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 .... 119.00
Johnstown,Pa. B2 .... 119.00
Lackawanna,N.Y. B2 .. 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 .... 119.00
Seattle(6) B3 ..... 140.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2, U5, W14 .. 119.00
S.Duquesne,Pa. U5 .... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 .. 122.50
S.Duquesne,Pa. U5 .... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Benwood,W.Va. W10 .... 5.05
Ind.Harbor,Ind. Y1 .... 5.05
Munhall,Pa. P5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS
AlabamaCity,Ala. R2 .... 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 .... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 .. 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 .... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 .... 6.65
Monessen,Pa. P7 ..... 6.40
Buffalo S47 ..... 6.40
Pittsburg,Calif. C11 .... 7.20
Portsmouth,O. P12 ..... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 .. 6.40
SparrowsPoint,Md. B2 .. 6.50
Sterling,Ill.(1) N15 .... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 .... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.60
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 .. 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 .... 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 .... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 .... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 .. 5.50
S.SanFrancisco B3 .... 6.15
Sterling,Ill. N15 ..... 5.50
Struthers,O. Y1 ..... 5.50
Torrance,Calif. C11 .... 6.20
Weirton,W.Va. W6 ..... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 .. 5.50
Lackawanna,N.Y. B2 .... 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 .... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N5 ..... 5.50
Weirton,W.Va. W6 ..... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 .. 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 .. 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 ..... 8.15
Lackawanna,N.Y. B2 .... 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Phoenixville,Pa. P4 .... 8.10
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 .. 8.05
S.SanFrancisco B3 .... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 .... 8.05
Lackawanna,N.Y. B2 .... 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 .... 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 .. 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 .... 6.50
Lackawanna,N.Y. B2 .... 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 .. 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 .... 5.30
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 .... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 .... 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 ..... 5.40
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 .. 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 .... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 .... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale Ill. A1 ..... 5.30
Seattle B2 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 .. 5.30
SparrowsPoint,Md. B2 .. 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 .... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 .... 5.30
Youngstown(27) R2 .... 5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 .. 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 ..... 7.95
Conshohocken,Pa. A3 .... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 .... 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 .. 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 .. 7.95
SparrowsPoint,Md. B2 .. 7.95
Sterling,Ill. N15 ..... 7.625
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 .... 7.95

PLATES, Alloy
Claymont,Del. P4 ..... 7.50
Coatesville,Pa. L7 ..... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 .... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 .. 7.50
SparrowsPoint,Md. B2 .. 7.50
Youngstown Y1 ..... 7.50

PLATES, Ingot Iron
Ashland c.l. (15) A10 .. 5.55
Ashland l.c.l. (15) A10 .. 6.05
Cleveland c.l. R22 ..... 6.05
Warren,O. R2 ..... 6.05

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont,Del. P4 ..... 6.375
Conshohocken,Pa. A3 .. 6.375
Ind.Harbor,Ind. I-2 .... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 .... 5.675
Aliquippa,Pa.(9) J5 .... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 .... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 .... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 .... 5.675
Emeryville,Calif. J7 .... 6.425
Fairfield,Ala.(9) T2 .... 5.675
Fairless,Pa.(9) U5 .... 5.825
Fontana,Calif.(9) K1 .... 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 .. 5.675
Johnstown,Pa.(9) B2 .... 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5 .. 5.925
Lackawanna(9) B2 .... 5.675
LosAngeles(9) B3 .... 6.375
Massillon,O.(23) R2 .... 6.15
Midland,Pa.(23) C18 .. 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Buffalo S47 ..... 5.675
Owensboro,Ky.(9) G8 .. 6.025
Pittsburg,Calif.(9) C11 .. 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
Riverdale,Ill.(9) A1 .... 5.675
Seattle(9) A24,B3,N15 .. 6.425
S.Ch'g'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 .. 5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15 .. 5.675
Sterling,Ill.(9) N15 .... 5.775
Struthers,O.(9) Y1 ..... 5.675
Tonawanda,N.Y. B12 .... 5.675
Torrance,Calif.(9) C11 .. 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5 .. 5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 .. 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 .... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 .... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .... 6.725
KansasCity,Mo. S5 .... 6.975
Lackawanna,N.Y. B2 .. 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
N.Tonawanda S47 ..... 6.725
Owensboro,Ky. G8 .... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 .. 6.725
S.Duquesne,Pa. U5 .... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 .... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 .... 8.30
Johnstown,Pa. B2 .... 8.30
KansasCity,Mo. S5 .... 8.55
Lackawanna,N.Y. B2 .. 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 .. 8.30
S.Duquesne,Pa. U5 .... 8.30
S.SanFrancisco B3 .... 9.05
Sterling,Ill. N15 ..... 7.925
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 .. 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 .. 5.925
Lackawanna(9) B2 .... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 .... 5.675
Tonawanda,N.Y. B12 .... 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30 .. 11.75*
Alloy
Ambridge,Pa. W18 .... 10.175
BeaverFalls,Pa. M12 .. 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ..... 8.10
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, H5, P17 .... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 .... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 .... 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 .... 9.10
LosAngeles(49) P2, R2 .. 9.10
Mansfield,Mass. B5 .... 8.20
Massillon,O. R2, R8 .... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 .. 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 .... 7.90
Putnam,Conn. W18 .... 8.20
Readville,Mass. C14 .... 8.20
Seattle(49) S30 ..... 9.10
S.Chicago,Ill. W14 .... 7.65
SpringCity,Pa. K3 ..... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 .. 8.15
Youngstown F3, Y1 .... 7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 .. 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .... 9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.025
Detroit B5, P17 ..... 9.225
Detroit H5, S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 .. 9.025
Gary,Ind. R2 ..... 9.025

GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2. .9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
N.Tonawanda S47 .....9.025
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Williamsport,Pa. S19 ..5.75

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ...7.95
Williamsport,Pa. S19 ..7.00
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks(D.R.) L5 ...20.50
McK.Rks.(Dir.Rolled)L513.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 .....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ...9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.125	7.375
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.125	7.375
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.225	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.375

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1)..9.525

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 .....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.H'rb'r,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 .....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ....6.875†
Niles,O. M21, S3 .....6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ....6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Branford Machine & Mfg.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating
F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.
H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnest Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania
N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.
O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P10 Precision Strip Mill Div., Solar Steel Corp.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.
R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Div., Roblin-Seaway Industries
T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.
U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.
V2 Vanadium-Alloy Steel
V3 Vulcan Kidd Steel Div., H. K. Porter Co.
W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Cold Drawn Steel Div., Standard Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ..5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ...8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 ...8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10.7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.425
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10 7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale,Ill. A1 .....7.425
RiverRouge,Mich. P10..7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ....7.975
Youngstown S41, Y1 ...7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
RiverRouge,Mich. P10	9.05	10.50	12.70	....	....
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....4.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ...7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ...7.425*
Riverdale,Ill. A1 .....7.425*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ..7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Basis Weight 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irwin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. We	6.10	6.25	6.40	6.55

TIN PLATE, Electrolytic 0.25 lb (100 lb basis wt) Coating

Aliquippa,Pa. J5 .....$9.10
Fairfield,Ala. T2 .....9.10
Fairless,Pa. U5 .....9.10
Fontana,Calif. K1 .....9.75
Gary,Ind. U5 .....9.10
GraniteCity,Ill. G4 ....9.20
Ind.Harb.,Ind. I-2, Y1 ..9.10
Irvin,Pa. U5 .....9.10
Niles,O. R2 .....9.10
Pittsburg,Calif. C11 ...9.75
SparrowsPt.,Md. B2 ....9.10
Weirton,W.Va. W6 .....9.10
Yorkville,O. W10 .....9.10

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.20
Fairless,Pa. U5 .....8.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1 8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

ELECTRO. TIN-COATED SHEET (20-27 gage; per 100 lb)

IndianaHarb.,Ind. Y1 ..$7.90

(21-27 gage; per 100 lb)

Aliquippa,Pa. J5 .....$7.90
Niles,O. R2 .....7.90

TIN PLATE, HOT DIPPED

COMMON COKE	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

HOLLOWARE ENAMELING (Black plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65
					Stator
Mansfield,O. E6					8.10
Vandergrift,Pa. U5					8.10
Warren,O. R2 (Locore)					8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70 15.70
Warren,O. R2	....	....	....	....	....	.... 15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
N.Tonawanda S47 .....8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00
Buffalo S47 .....8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Ind.Harbor,Ind. Y1 ....12.65
KansasCity,Mo. U3 ....12.90
LosAngeles(2) B3 ....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16 .12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.075
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.075
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.20
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.20
SparrowsPt.,Md. B2 ....9.85
Johnstown,Pa. B2 .....10.30
KansasCity,Mo. S5 ....10.55
Kokomo,Ind. C16 .....10.30
Minnequa,Colo. C10 ....10.55
Monessen,Pa. P16 .....10.30
Muncie,Ind. I-7 .....10.50
Palmer,Mass. W12 .....10.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....10.30
Worcester,Mass. A7,J6.10.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ....13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Pa. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.20
SparrowsPt.,Md. B2	8.88
Sterling,Ill. (37) N15	8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	9.50
SparrowsPt.,Md. B2	9.16
Sterling,Ill. (37) N15	9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	9.55
SparrowsPt.,Md. B2	9.21
Sterling,Ill. (37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill. (7) N15	214

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Streling,Ill. (7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80†‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80†‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75§
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½Ga. J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa. (42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
S.Chicago,Ill. R2	187**
Sterling,Ill. (7) N15	192

WIRE, Merchant Quality 6 to 8 gage

	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.10	9.85
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
CrawfordsvilleM8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'vill.Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
S.SanFran. C10	9.95	10.50**
S.Chicago R2	9.00	9.55**
Spar'waPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

FASTENERS

SCREWS, NUTS, BOLTS

(Consumer discounts per cent off list prices, plain finishes. For less than full container quantities, add 25 per cent; attaching nuts to bolts in sizes ¼ in. through ⅝ in. diameter through 8 in. in length, price on application. Discounts are determined by the quantity of screws, nuts, and bolts ordered for one destination at one time.)

Base, one kg	43.00
20,000 lb or more	53.00

SCREWS, SETSCREWS

Hex Screws and High Strength Hex Screws, through 1 in. x 12 in.:

Base, one keg	43.00
20,000 lb or more	53.00

Hex Screws 1⅛ in. diameter and larger: See net price schedule.

Fillister Head Screws, coarse thread:

Packages	+70.00
Bulk	+28.00

Flat Head Screws, coarse thread:

Packages	+100.00
Bulk	+52.00

Setscrews, Square Head, Cup-point, coarse thread:

Packages	+10.00
Bulk	15.00

(Bulk discounts on fillister, flat head, and set screws apply only to products ordered in these minimum quantities: ¼ in. through ⅝ in. diameter, 15,000 pieces; ⅞ in. through ⅝ in. diameter, 5000 pieces; and ¾ in. through 1 in. diameter, 2000 pieces.)

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburg, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter, 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	61.57	48.13
2¾	12	58.73	6 1.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.725
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	41.50	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	50.00	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; Branford Machine & Mfg. Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
NorthTonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	78.11	78.61	79.11	....
Rochester, N.Y., deld.	69.87	70.37	70.87	....
Syracuse, N.Y., deld.	71.22	71.72	72.22	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
SouthChicago, Ill. R2	66.00	66.50	66.50	67.00
SouthChicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland A7, R2	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte.Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.60%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 pe. ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffao H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.45% max P)

CalvertCity, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.18
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.06	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.13	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.18	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	10.50	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	8.00	9.28
Indianapolis	9.66	10.64	10.57	11.83	9.66	11.09	16.39	10.01	9.50	11.79
KansasCity	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.27	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	10.48	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.35	11.37	10.05	13.25	16.40	10.35	9.04	11.82
New York	9.81	10.34	11.35	11.37	10.05	13.25	16.40	10.35	9.04	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	10.51	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	8.82	9.49	10.64	10.99	8.82	11.49	16.54	9.17	8.66	10.95
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.05	17.70	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2½ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3% for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max), Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%), Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb. $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.5c per lb contained Si. Packed, c.l. 17.0c, ton lot 18.45c, less ton 20.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

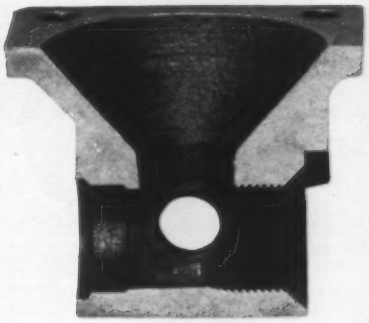
65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

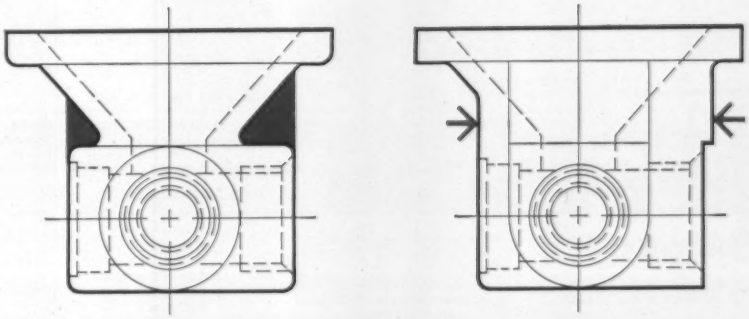
75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.





REDESIGN CUT COSTS

A CASE IN POINT—Hamilton Foundry engineers suggested a single design change which saved over 50% in pattern costs and cut the unit price 28% on the quantities ordered.

Curtis Automotive Devices, Inc. uses this casting on their DYNA-FOG® Insecticide Applicator. As initially designed, the part had an undercut which required cores in the mold. Hamilton Foundry's engineers suggested a simplified design which eliminated the cores and made dramatic savings possible in tooling costs and unit prices. You can expect this kind of engineering assistance from Hamilton Foundry.

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Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Sillica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisillica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Hays, Pa., Hammond, Ind., $107; Narlo, Ohio, $109.50. Magnesite: Narlo, Ohio, $128; Hays, Pa., Hammond, Ind., $130.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$14.75-15.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 82.00-85.00c nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	35.00-37.00†
Domestic	
Rail nearest seller	
48% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
60% min	$4.15-4.40
65% min	4.50-4.75

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
..	60	12.65
1..	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh bags	7.50††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe...36.75, ton deld. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 42.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90-10.	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4600	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5% below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. (Source of shipment: Western Continental Europe.)

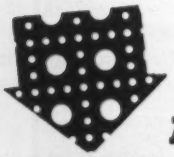
	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.15	....	$5.10	$5.00	$5.30
Bar Size Angles	5.15	....	5.10	5.00	5.30
Structural Angles	5.05	....	5.00	4.90	5.20
I-Beams	5.05	....	5.00	4.90	5.20
Channels	5.15	....	5.10	5.00	5.30
Plates (basic bessemer)	5.30	....	5.25	5.15	5.45
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	24.16	....	24.09	23.81	25.54
Barbed Wire (†)	6.25	....	6.20	6.10	6.40
Merchant Bars	5.15	....	5.10	5.00	5.30
Hot-Rolled Bands	5.65	....	5.60	5.50	5.80
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	....	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.15	....	7.10	7.00	7.30
(Source of Shipment: Japan)					
Wire, galvanized	$8.62	....	$8.62	$8.62	$8.57
Wire, bright	7.60	....	7.60	7.60	7.55
Wire Rods, O.H. No. 5 (Sumitomo)	5.80	....	5.80	5.75	6.00
Strand, stress relieved (Sumitomo)					
⅜ in. diam, 1000 lineal ft	39.90	....	39.90	39.90	39.50
7/16 in. diam, 1000 lineal ft	53.50	....	53.50	53.50	53.00
Bright common wire nails	7.15	....	7.15	7.15	7.15

†Per 82 lb net reel. §Per 100 lb keg, 20d and heavier. *Except Boston.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant,	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00



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PROGRESSIVE WELDER & MACHINE CO.

DESIGNERS & BUILDERS OF FINE EQUIPMENT FOR OVER 25 YEARS

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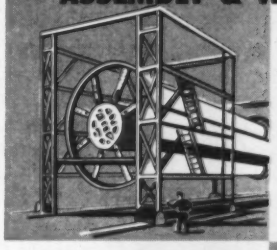

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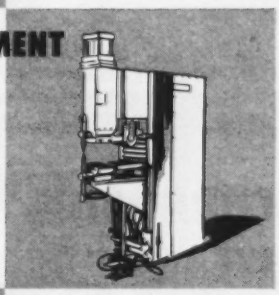
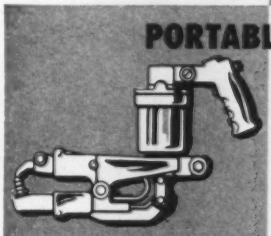
We offer a complete line of standard and special resistance and arc welding machines. Standard of efficiency and dependability for over 25 years.



PORTABLE WELDING GUNS



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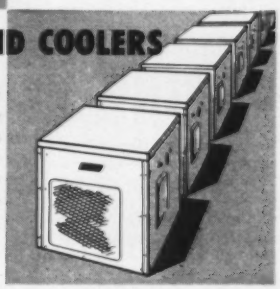
Economical, compact, efficient, low maintenance "packaged cooling" units for tool coolants, hydraulic oils, welders, temperature control systems, delicate instruments and specialized uses.



PROGRESSIVE WELDER & MACHINE CO.
915 Oakland, Pontiac, Mich.

Shakeout in Scrap Still Underway

STEEL's composite on No. 1 heavy melting grade falls another $1.67 a ton to $33 as demand continues to dry up. Japanese shipment deferments are market depressant in East and West

Scrap Prices, Page 234

● **Philadelphia**—Prices have lost the support of strong export demand, and the major steel grades are off $3 to $5.50 a ton, one of the sharpest declines in years. Minor steel grades are off $1.50 to $2.50 a ton. Heavy breakable cast is down $1.

Some export tonnage is moving—but largely against old orders. There have been some deferments on contracts originally scheduled for shipment later this year. This applies particularly to tonnage scheduled for Japan, which has long been the largest single foreign buyer. Continued congestion at Japanese ports and financing complications are contributing to the slack demand.

As a result of the increasing export weakness, domestic consumers can obtain sharp concessions on even small purchases. No. 1 heavy melting is holding at $34, No. 2 heavy melting at $28, No. 1 bundles and No. 1 busheling at $36, No. 2 bundles at $23, and electric furnace bundles at $38.

● **New York** — Brokers' buying prices have dropped $2 a ton on No. 1 heavy melting steel and No. 1 bundles to $27-$28. Prices on No. 2 heavy melting have been dropped $1 a ton to $21-$22. Stainless steel scrap is off to $150-$155 on 18-8 sheets, clips, and solids and down to $70 on 18-8 borings and turnings.

● **Pittsburgh**—Prices are unchanged in a dull market. The district's largest mill consumer probably won't resume buying until its operations reach 85 per cent of capacity, but a smaller mill is expected to purchase a sizable tonnage for Lifo inventory purposes before the end of the year.

● **Chicago**—Prices are nominal here following declines of as much as $7 a ton last week. Actually, the market is untested. Buying of steelmaking grades is absent, and at least one leading mill continues to limit the number of cars it will accept in deliveries against old purchases. The mills appear to have surplus stocks.

● **Cleveland** — Despite the sharp drop in prices recorded the last couple of weeks, not much in the way of new buying by the mills is noted. One Valley mill bought some No. 1 heavy melting industrial material, paying $37.50 a ton, about $3.50 under the price it paid on a previous order.

● **Detroit**—The market continues to be soft, with orders lacking. Dealers and brokers think there'll be a slight upturn in prices when next month's auto lists are brought out, counteracting the sharp decline in

CORROSION? WEAR?

End pump problems with ADVANCED

Deming End Suction Centrifugal Pump. 1" to 6" discharge size. 10 G.P.M. to 2400 G.P.M. Heads to 240 feet. ¼ H.P. to 25 H.P. Most sizes right or left hand rotation.

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Deming advance design features show you why Deming Pumps handle toughest jobs with ease—

■ Liquid ends range from tough cast iron to special corrosion-resistant alloys.

■ 4-piece liquid ends get rigid, leak-stopping support — from ruggedly designed power end and 2-ball bearing suspension.

■ You can regulate capacity and head—because of Deming axial adjustment.

■ A Deming is the simplest to service.

Send your problem to Deming—"Pump Information Headquarters."

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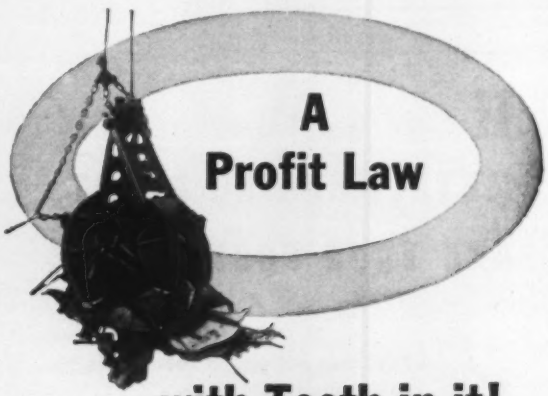
DIVISION CRANE CO.
1151 Broadway • Salem, Ohio

Write for

Bulletin 4011-E



A Profit Law with Teeth in it!

• The Owen Grapple makes profit-earning a strict rule . . . and makes it stick! Owen's exclusive, patented, independent tine action assures big loads in a powerful grip. More payloads faster! Prompt service through ample inventory on new equipment and parts.

Write for full details.

The OWEN
BUCKET COMPANY
BREAKWATER AVENUE • CLEVELAND 2, OHIO
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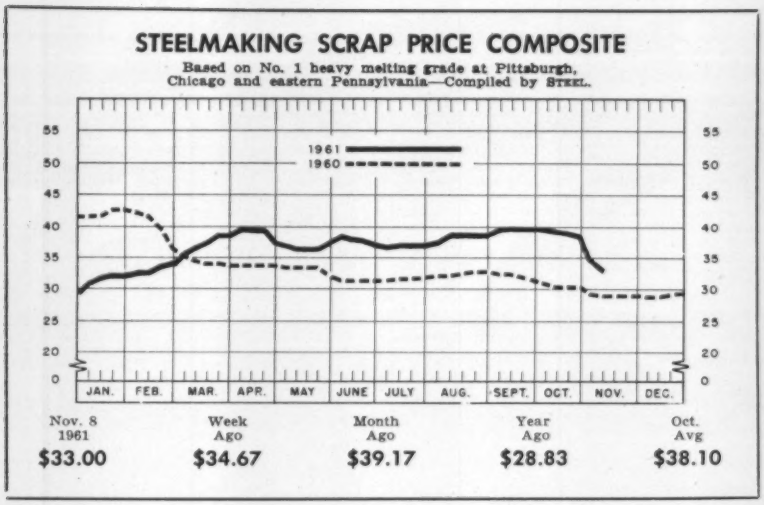

prices this month. Busheling is off to $27 on a small buy. A 1000 ton order for foundry steel went at $30. Turnings and stainless are soft. Export buying appears to be halted. Only spot purchases for shipment to Canada are reported.

• **Buffalo**—Primary grades of scrap are quoted down $2 a ton, and the secondary grades are off $1. Dealers describe the market as weak, with mills placing only token orders in the turning grades for November delivery.

• **Cincinnati**—Prices are holding in this market following the recent downward adjustment. Some traders think the market is on bottom.

• **St. Louis**—Two local mills are placing only token tonnage with dealers, but some traders think the market is on bottom. There were a few adjustments in prices last week, but they largely represented shifts in dealer views based on limited sales.

• **Birmingham**—There is little buying being done, and prices are tending downward. Brokers are offering $34-$35 for No. 1 heavy melting, $23-$24 for No. 2 heavy melting, $34-$35 for No. 1 bundles, $20-$21 for No. 2 bundles, $38-$39 for No. 1 busheling, $9-$10 for cast iron borings, $16-$17 for machine shop turnings, $18-$19 for shoveling turnings. Lower prices are also quoted on the railroad steel grades and the cast iron grades.

• **Houston**—Prices are expected to weaken later this month as demand slumps. Of the two major Texas mills, one is out of the market, and the second is expected to restrict purchases after Nov. 15. Export demand is virtually nonexistent.

• **Tacoma, Wash.**—Dealers report a further drop in prices, now quoting No. 1 heavy melting at $40,

(*Please turn to Page* 239)

WARD
For Countless Uses
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SPRING STEEL
AMERICA'S LEADING SUPPLIER
Where
SERVICE and QUALITY
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WARD STEEL CO.
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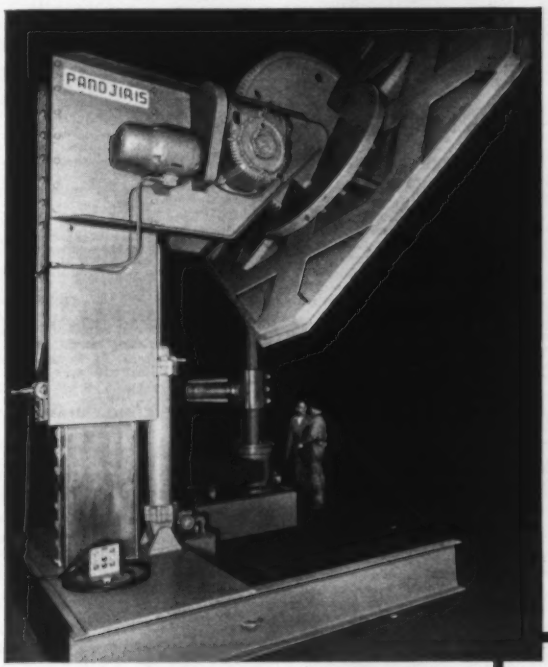


Put 20 tons where you want it

Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS
DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Nov. 8, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 8	$33.00
Nov. 1	34.67
Oct. Avg.	38.10
Nov. 1960	28.83
Nov. 1956	61.83

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	27.00-28.00
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	33.00-34.00
No. 1 factory bundles	39.00-40.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	40.00-41.00
3 ft and under	37.00-38.00
Heavy turnings	31.00-32.00
Punchings & plate scrap	42.00-43.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	32.00-33.00
Stove plate	32.00-33.00
Unstripped motor blocks	23.00-24.00
Clean auto cast	33.00-34.00
Drop broken machinery	44.00-45.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 2 ft and under	51.00-52.00
Rails, 18 in. and under	52.00-53.00
Random rails	46.00-47.00
Angles, splice bars	43.00-44.00
Railroad specialties	44.00-45.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	190.00-195.00
18-8 turnings	115.00-120.00
430 bundles & solids	90.00-95.00
410 turnings	55.00-60.00

CHICAGO

No. 1 hvy melt., indus.	32.00-33.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 hvy melting	27.00-28.00
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	22.00-23.00
No. 1 busheling, indus.	32.00-33.00
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	38.00-39.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	33.00-34.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
R.R. malleable	44.00-45.00
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	42.00-43.00
Axles	54.00-55.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles, solids	175.00-180.00
18-8 turnings	100.00-105.00
430 bundles & solids	80.00-85.00
430 turnings	45.00-50.00

BUFFALO

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	*12.00-13.00*
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	*37.00-38.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	*40.00-41.00*
Rails, 3 ft and under	*46.00-47.00*
Railroad specialties	*39.00-40.00*
Rails, rerolling	*62.00-63.00*

CLEVELAND

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	22.00-23.00
No. 1 factory bundles	37.00-38.00
No. 1 bundles	32.00-33.00
No. 2 bundles	19.00-20.00
No. 1 busheling	32.00-33.00
Machine shop turnings	15.00-16.00
Shovel turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	*36.00-37.00*
Low phos. punchings & plate	33.00-34.00
Alloy free, short shovel turnings	20.00-21.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	26.00-27.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	27.00-28.00
Brake shoes	37.00-38.00
Clean auto cast	39.00-40.00
Burnt cast	30.00-31.00
Drop broken machinery	45.00-46.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	43.00-44.00
Rails, 18 in. and under	48.00-49.00
Cast steel	37.00-38.00
No. 1 railroad cast	44.00-45.00
Railroad specialties	44.00-45.00
Angles, splice bars	42.00-43.00
Rails, rerolling	52.00-53.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	85.00-90.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	23.00-24.00†
No. 1 busheling	36.00-37.00
No. 1 bundles	36.00-37.00
No. 2 bundles	21.00-22.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	36.50-37.50
Electric furnace bundles	36.50-37.50

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.50-32.50
No. 2 heavy melting	25.00-26.00
No. 1 bundles	32.50-33.50
No. 2 bundles	18.00-19.00
No. 1 busheling	31.50-32.50
Machine shop turnings	8.00-9.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	13.00-14.00
Cast iron borings	13.00-14.00
Low phos., 18 in.	40.00-41.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	29.00-30.00
Charging box cast	33.00-34.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	*28.00-30.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	*27.00-28.00*
Machine shop turnings	*8.00-9.00*
Mixed borings, turnings	*9.00-10.00*
Shovel turnings	*11.00-12.00*

Cast Iron Grades

No. 1 cupola	*30.00-31.00*
Mixed cast	*28.00-29.00*
Heavy breakable	*24.00-25.00*
Unstripped motor blocks	*20.00-21.00*
Clean auto cast	*37.00-38.00*

Stainless Steel Scrap

18-8 bundles & solids	165.00-170.00
18-8 turnings	*70.00-75.00*
430 bundles & solids	*65.00-70.00*

PHILADELPHIA

No. 1 heavy melting	*34.00*
No. 2 heavy melting	*28.00*
No. 1 bundles	*36.00*
No. 2 bundles	*27.00*
No. 1 busheling	*36.00*
Electric furnace bundles	*38.00*
Mixed borings, turnings	*16.00†*
Shovel turnings	20.00
Machine shop turnings	*13.00†*
Heavy turnings	*24.00†*
Structurals & plates	*38.00-39.00*
Couplers, springs, wheels	*40.00-41.00*
Rail crops, 2 ft & under	*48.00-50.00*

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	*39.00*
Drop broken machinery	48.00-49.00
Malleable	*48.00†*

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	22.00-23.00
No. 1 bundles	*27.00-28.00*
No. 2 bundles	19.00-20.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	32.00-33.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	*31.00*
No. 2 heavy melting	27.00
No. 1 bundles	33.00
No. 2 bundles	22.00
No. 1 busheling	32.00
Machine shop turnings	*14.50*
Shovel turnings	*16.50*

Cast Iron Grades

No. 1 cupola	*35.00*
Charging box cast	33.00
Heavy breakable cast	*32.00*
Unstripped motor blocks	33.00
Clean auto cast	37.00
Stove plate	31.00

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00*
Rails, random lengths	*39.00*
Rails, rerolling	54.00
Rails, 18 in. and under	*43.00*
Railroad specialties	39.00
Angles, splice bars	38.00

BIRMINGHAM

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*36.00-37.00*
Cast iron borings	*9.00-10.00*
Machine shop turnings	*16.00-17.00*
Shovel turnings	*18.00-19.00*
Bar crops and plate	*41.00-42.00*
Structurals & plate	*40.00-41.00*
Electric furnace bundles	*36.00-37.00*
Electric furnace:	
3 ft and under	*34.00-35.00*
2 ft and under	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Stove plate	*39.00-40.00*
Unstripped motor blocks	*29.00-30.00*
No. 1 wheels	*33.00-34.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
Rails, rerolling	*46.00-47.00*
Rails, 2 ft and under	*44.00-45.00*
Rails, random lengths	*40.00-41.00*
Angles, splice bars	*42.00-43.00*

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
Machine shop turnings	12.50-13.00
Crushed turnings	*18.00-19.00*
Low phos. plate & structurals:	
3 ft	41.00-42.00
2 ft and under	45.00-46.00

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Heavy breakable	25.00-26.00
Foundry malleable	29.00-30.00
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt (3 ft)	*38.00-39.00*

LOS ANGELES

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*35.00*
No. 2 bundles	*22.00-23.00*
No. 2 bundles (export)	*23.00-24.00*
Machine shop turnings	*13.00*
Shovel turnings	*13.00*
Cast iron borings	*10.00-12.00*
Electric furnace scrap	*43.00-45.00*

Cast Iron Grades

No. 1 cupola	*42.00-43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	46.00
No. 2 heavy melting	41.00
No. 2 bundles	26.00
Shovel turnings	18.00
Electric furnace	49.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable	35.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	33.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	46.00
No. 1 hvy (unprepared)	41.00
No. 2 heavy melting	41.00
No. 2 hvy (unprepared)	37.00
No. 2 bundles	26.00
Shovel turnings	16.00
Electric furnace	49.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Stove plate	33.00
Unstripped motor blocks	33.00

SAN FRANCISCO

No. 1 heavy melting	*38.00***
No. 2 heavy melting	*33.00***
No. 1 bundles	*27.00***
No. 2 bundles	*23.00***
Machine shop turnings	*15.00*
Mixed borings, turnings	*15.00*
Cast iron borings	*15.00*
Heavy turnings	*15.00*
Shovel turnings	*15.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	30.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	30.00
Unprepared	24.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

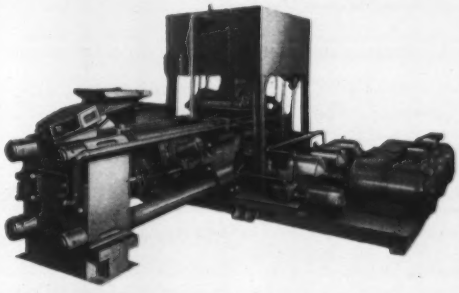
BRIQUETTE YOUR SCRAP WITH A

SPO-MILWAUKEE BRIQUETTING PRESS!

Here's the smart way to turn those mountains of chips, turnings and borings into higher valued scrap that will result in greater profits.

Naturally . . . briquetted scrap is easier to handle and a lot cheaper to transport . . . requires minimum storage area and facilitates faster disposal. RESULT? . . . PROFIT!

Investigate the advantage of installing a SPO-MILWAUKEE BRIQUETTING PRESS today. Ask yourself these questions . . . *Does our machine tool scrap output range from four-tons per day to 9-tons per hour?* . . . Do we want to turn a problem into a profit? It's possible you can answer both questions and solve related problems with a SPO-MILWAUKEE Briquetting Press.



WORLD'S LARGEST SUPPLIERS OF MOLDING MACHINES

Just off the press . . . Bulletin BP-217 is yours for the asking. Complete with specifications, illustrations and photos.

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10483-81

This Year's Profits Lag Sales Pace

Nonferrous Metal Prices, Pages 238 & 239

PROFITS ARE DOWN for most nonferrous companies despite generally modest gains in sales. The explanation is simple: Higher costs, lower prices. Virtually every metal is involved.

Price fighting, spurred by domestic overcapacity and imports, has been severe and widespread. Even the quoted prices on some major metals are under year-ago levels.

Cites Revere Copper & Brass Inc.: "Lower foreign costs, including labor, allied with overcapacity in the domestic mills through lack of demand, have produced fiercely competitive selling prices in copper, brass, and aluminum products. Profit margins have been steadily declining the last several years, and it can only be hoped that the improvement in business may be helpful in stemming further erosion of the price structure."

The 1961 Pattern:

Less Income from Greater Sales

(Nine month earnings)

	1961	1960
ALUMINUM		
Aluminum Co. of America	$29,341,497	$30,279,511
Kaiser Aluminum & Chemical Corp.	16,120,000	17,539,000
Reynolds Metals Co.	17,660,000	19,072,000
COPPER		
Copper Range Co.	1,075,127	(a)209,006
Kennecott Copper Corp.	47,766,643	62,825,402
Inspiration Consolidation Copper Co.	3,070,648	3,740,577
Magma Copper Co.	6,811,414	5,802,660
Phelps Dodge Corp.	29,526,000	27,195,000
BRASS AND BRONZE		
Calumet & Hecla Inc.	992,835	2,587,766
Plume & Atwood Mfg. Co.	290,736	187,191
Revere Copper & Brass Inc.	5,514,605	5,246,514
LEAD-ZINC		
National Lead Co.	36,194,726	37,543,384
New Jersey Zinc Co.	1,244,119	2,093,442
St. Joseph Lead Co.	4,717,616	2,092,520
OTHERS		
American Smelting & Refining Co.	14,224,500	19,281,500
Apex Smelting Co.	538,640	652,317
Cerro Corp.	3,503,289	7,824,143
General Bronze Co.	(a)678,651	(a)292,452
International Silver Co.	1,724,112	1,530,513
Molybdenum Corp. of America	526,471	197,813

(a)Loss.

• **Sales Not Only Answer**—The yearend financial reports of some of the nation's top metals producers will illustrate that higher sales don't make greater earnings automatic. For example, the copper industry is set to sell more tons of metal than it has in any year since 1956. Yet it may not match last year's earnings. Major reason: Through most of 1960, copper sold at 33 cents a pound. This year, the price has been 31 cents a pound and less.

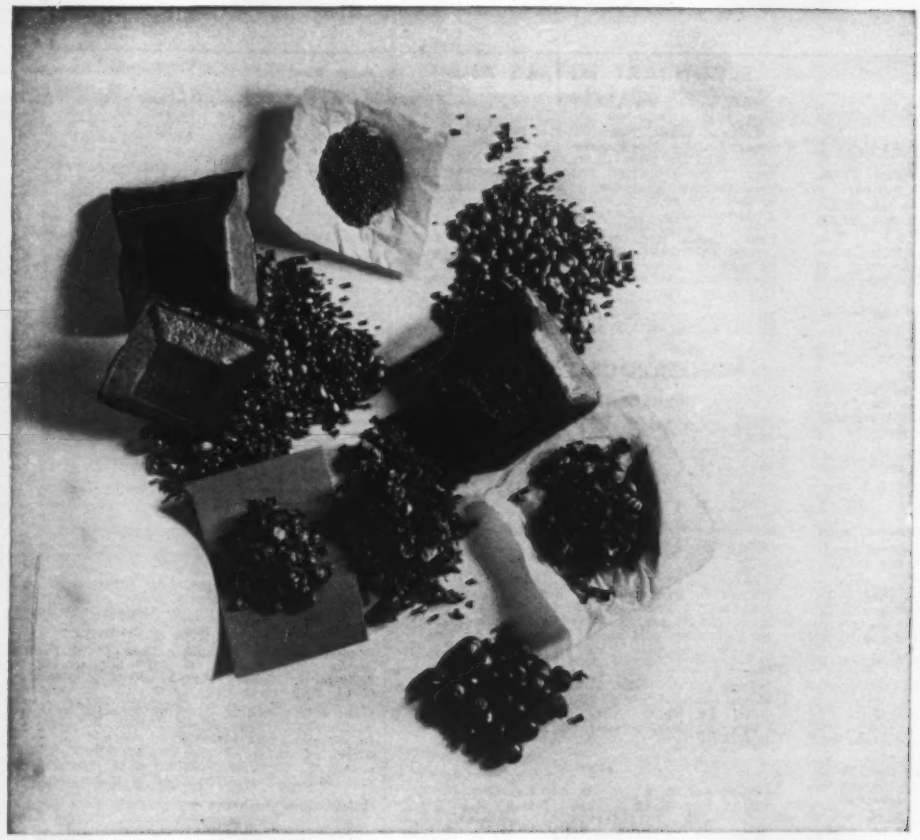
Zinc is another example. Sales should set a four year mark, but the official price has consistently stayed under the year-ago levels, and orders continue to be filled under the published price on certain premium grades. Result: Only so-so profits. Profits of the lead industry got an added jolt earlier this month when the price was dropped 0.5 cent (to 10.50 cents a pound, the lowest since 1950).

Brass mills will show spotty profit improvements, but they'll show little correlation with sales gains. Reasons: A continuation of intense price fighting, plus higher costs that can't be passed along.

The aluminum industry is caught in what is probably the most vicious price fighting in the nonferrous area. Mill product prices have been weak all year. Ingot quotations were recently cut 2 cents a pound, mill products 0.5 to 2 cents a pound. Lower than anticipated sales weaken chances that the industry will be able to boost any prices this year.

• **Looking to '62**—Most metalmen look for significant profit improvements in '62 if economic forecasts hold up. The big question mark is labor. Major contracts must be negotiated in the aluminum, copper, and lead-zinc industries.

ASARCO ALLOY ADDITIVES



Improved alloys at less cost with "ready to add" master alloys

Asarco alloying materials, produced under strict metallurgical controls, reduce alloying costs, improve casting performance, and contribute substantial savings in subsequent production costs.

BISMUTH is used to improve the dispersion of graphite in malleable iron castings. Available in shot, pellet and ingot forms.

SELENIUM improves machinability of stainless steel, controls its porosity. Asarco master alloys include ferro-selenium and nickel-selenium containing 50-60% selenium, and selenium powder.

TELLURIUM is used for degasifying, to minimize porosity, and improve machinability of stainless steel. It is also used for producing hard chilled iron castings. Ferro-tellurium containing 50-58% tellurium is available in chunk form. Tellurium is also available in powder, stick, slab and tablet forms.

Federated Metals Division produces and sells:

PELLET LEAD, readily assimilated into molten steel, dissolves into finely dispersed particles which lubricate and result in faster, smoother machining, longer tool life.

PHOSPHOR COPPER used as a deoxidizer, in shot or waffle form, improves castability, assures sharper detail, reduces porosity.

OTHER ALLOY ADDITIVES produced by Federated are: Aluminum, Arsenical Copper, Chromium Copper, Copper-Nickel Shot, Manganese Copper, Silicon Copper, Titanium Aluminum, Copper Magnesium, Copper Shot, Cadmium Copper, Copper Iron, Aluminum Copper.

For complete information, write on your company letterhead to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, New York.

ASARCO

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 30 and 50 lb ingots, 24.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.20; No. 43, 25.30; No. 195, 26.70; No. 214, 28.10; No. 356, 26.00, 30 and 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $40 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.30; chemical, 10.40; corroding, 10.40; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pig, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 122.625.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max), $1.37 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7.25-7.75 per lb; 100-500 lb, $6.75-7.25 per lb; 500-1000 lb, $6.25-6.75; over 1000 lb, $6.25 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00; No. 12 foundry alloy (No. 2 grade), 21.25; 5% silicon alloy, 0.60 Cu max, 23.00; 13 alloy, 0.60 Cu max, 23.00; 195 alloy, 24.25; 108 alloy, 21.75. **Steel** deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.50.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.98, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.98, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.00 per cwt; pipe, full coils, $16.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $5.70-15.50; sheared mill plate, $4.45-9.00; wire, $5.00-9.50; forging billets, $3.00-4.75; hot-rolled and forged bars, $3.39-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $11.00-16.00; H.R. strip, $11.00-15.00; C.R. strip, $13.00-18.00; forged or H.R. bars, $11.00-15.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.183	24-72	72-180	44.40-47.00
0.183-0.154	24-72	72-180	44.40-47.00
0.154-0.120	24-72	72-180	44.90-47.80
0.120-0.096	24-72	72-180	44.90-47.80
0.096-0.076	24-72	72-180	45.40-49.30
0.076-0.060	24-72	72-180	45.90-50.10
0.060-0.047	24-72	72-180	46.40-51.30
0.047-0.037	24-72	72-180	46.90-52.70
0.037-0.030	24-72	72-180	47.40-54.30
0.030-0.023	24-60	72-180	47.90-56.10
0.023-0.018	24-48	72-144	48.40-56.40
0.018-0.014	24-48	72-144	50.20-57.00
0.014-0.011	24-48	72-144	52.50-59.00
0.011-0.0085	24-36	72-96	55.20
0.0085-0.007	24-36	72-96	58.20
0.007-0.006	24-36	72-96	61.00

ALUMINUM (continued)

Plates: 1100, 3003, and 5005, mill finish, 0, H12, and H14 tempers, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
3.000-2.000	6-144	72-240	45.10-50.00
2.000-1.251	6-144	72-240	45.50-50.30
1.251-0.751	6-144	72-240	44.50-49.60
0.751-0.250	6-144	72-240	44.50-49.60

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	76.30	....	....
0.188	63.20	62.20	....	79.10
0.250	60.00	61.60	72.70	73.10
0.375	59.20	62.80	71.00	71.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	62.80	71.00	71.00
0.625	59.20	62.80	67.80	66.90
0.750	57.70	61.00	61.60	62.80
0.875	57.70	61.00	61.60	62.80
1.000	57.70	61.00	61.60	62.80
1.125	55.30	58.50	59.50	60.50
1.375	55.30	58.50	59.50	60.50
1.500	55.30	58.50	59.50	60.50
1.625	53.00	55.70	....	58.30
1.750	53.00	55.70	58.30	58.30
1.875	53.00	55.70	....	58.30
2.000	53.00	55.70	58.30	58.30
2.250	51.50	54.00	....	58.30
2.500	51.50	54.00	....	58.30
2.750	49.90	52.20	....	58.30
3.000	49.00	52.20	....	58.30
3.250	....	52.20	....	....
3.375	....	52.20	....	....

Selected sizes.

Forging Stock: Rounds, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 45.50-55.60; 6061, 41.50-55.60; 7075, 58.50-64.60; 7079, 58.50-66.60.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes, 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. width: .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.75-24.25; No. 2 heavy copper and wire, 21.75-22.25; light copper, 19.00-19.50; No. 1 composition red brass, 21.00-21.50; No. 1

BRASS MILL PRICES

(Copper or Copper Alloy No.)	MILL PRODUCTS a Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES d (Based on copper at 31.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper (110)	56.13b	50.36-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass (268, 270)	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80% (240)	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85% (230)	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90% (220)	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze (675)	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal (365)	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass (464)	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Brass (651)	61.39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10% (745)	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5% (510)	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 20.00-20.50; new brass clippings, 16.00-16.50; light brass, 13.00-13.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 15.00-15.50; auto radiators, unsweated, 17.00-17.50; cocks and faucets, 17.25-17.75; brass pipe, 16.00-16.50.

Lead: Soft scrap lead, 6.75-7.00; battery plates, 2.50-2.75; linotype and stereotype, 8.00-8.50; electrotype, 7.50-7.75; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 3.00-3.50; segregated high copper clips, 9.25-9.75; mixed low copper clips, 9.75-10.25; mixed high copper clips, 9.25-9.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.00-14.50; segregated high copper clips, 12.50-13.50; mixed low copper clips, 12.00-13.00; mixed high copper clips, 11.00-12.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 9.75; clean borings and turnings, 8.50; segregated low copper clips, 13.00; segregated high copper clips, 12.25; mixed low copper clips, 12.50; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; refinery brass (60% copper) dry copper content, 23.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 24.00; No. 1 composition solids, 24.50; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 20.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 141.50; 200-499 lb, 140.00; 500-999 lb, 139.50; 1000 lb or more, 139.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.85, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chrome Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.5; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cynide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 500-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 bl, 30.50; 40,000 lb or more, 30.00.

Sodium Cynaide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 89.60; 100-600 lb, 79.90; 700-1900 lb, 77.20; 2000-9990 lb, 75.30; 10,000 lb or more, 74.00.

Stannous Chloride (Anhydrous): 100 lb, 149.00; 400 lb, 139.00; 800-19,000 lb, 177.70; 20,000 lb or more, 113.50.

Stannous Sulphate: Less than 50 lb, 156.30; 50 lb, 126.30; 100-1900 lb, 124.30; 2000 lb or more, 122.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 233*)

No. 2 heavy melting at $35, and No. 2 bundles at $24. Much will depend on the trend of prices on tonnage for Japan.

• **Seattle**—Dealers hesitate to quote prices for publication, though admitting they are under recently published levels. Domestic buying is limited, and Japanese requirements are expected to influence the market trend.

• **Los Angeles**—The market is depressed. Prices are down an average of $7 a ton on most grades. Some traders are predicting a further drop. Inventories are heavy, with most dealers long on supplies of No. 2 heavy melting.

• **San Francisco**—A combination of dull demand and stretched out Japanese buying has brought about another drop of $2-$4 a ton in prices quoted on the top grades of steelmaking scrap.

Extensive Scrapping of Obsolete Lake Ships Seen

Dry dock and other ship facilities at Ashtabula, Ohio, owned by the American Ship Building Co., Cleveland, have been leased by Luria Bros. & Co. Inc., a division of Ogden Corp. The facilities will be used for scrapping ships.

Shipbreaking operations will begin shortly with the scrapping of 7000 tons of midbodies from Great Lakes ore carriers. Luria has purchased the *Sainte Marie*, a car ferry and icebreaker at St. Ignace, Ont., for scrapping at Ashtabula.

Robert E. Schroeder, Midwest regional vice president of Luria, says that if the Ashtabula operation proves successful, the company hopes to maintain a long range program in shipbreaking.

Pig Iron . . .

Pig Iron Prices, Page 228

Merchant pig iron business is moderately active. Sellers anticipate steadiness until the latter part of December. With plentiful supplies at the producer level and little prospect of an early price boost, foundries are buying iron hand to mouth.

Pig iron from British Columbia is supplying the needs of consumers in the Seattle area. Formerly, Australian and South African iron was in favor in the area.

50% Ferrosilicon Price Raised by Vanadium Corp.

Vanadium Corp. of America, New York, announced an increase in its price on 50 per cent ferrosilicon as of Nov. 1. The upward adjustment of 1 cent (about 7 per cent) revises the base price from 13.5 to 14.5 cents per pound of contained silicon, f.o.b. nearest production plant.

The new price is still below that in effect Jan. 1, 1961, and only partially offsets increased labor and materials costs. The move also returns the price of 50 per cent ferrosilicon to a more equitable relationship with the higher silicon grades, which did not change when 50 per cent ferrosilicon prices dropped in February and May of this year.

CLASSIFIED

Help Wanted

SHOP SUPERINTENDENT
COMPETENT WITH AT LEAST FIVE YEARS EXPERIENCE IN STEEL, STAINLESS STEEL, ALUMINUM PLATE FABRICATION; MUST KNOW THE ASME CODE, PRESSURE VESSELS, AND ALL MODERN WELDING TECHNIQUES; MUST HAVE ABILITY TO LEAD 100 MEN; EXCELLENT OPPORTUNITY WITH GROWING COMPANY IN NEW FIVE ACRE PLANT. SUBMIT DETAILS OF EXPERIENCE AND SALARY REQUIREMENTS TO: MR. O H. GARDNER, COLE ENGINEERING INC., 24747 CLAWITER ROAD, HAYWARD, CALIFORNIA.

GENERAL FOUNDRY SUPERINTENDENT experienced in producing light semi-steel and ferrous iron castings. Under 45. Married. Reply Box 972, STEEL, Penton Bldg., Cleveland 13, Ohio.

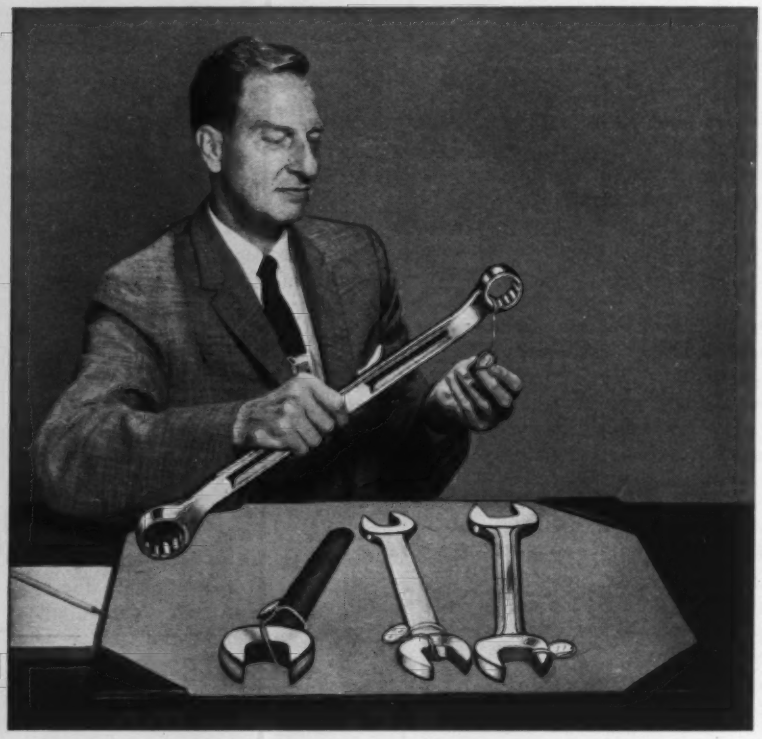
Representatives Wanted

One of the nation's leading Ductile Iron, Gray Iron, Brass and Aluminum Foundries needs more representatives. Send resume and advise area desired. Box No. 974, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $20.00, each additional word, .40; all capitals, 50 words or less $23.00, each additional word .50; all capitals leaded, 50 words or less $28.00, each additional word .65. "Position Wanted" set solid, 25 words or less $5.50, each additional word .22; all capitals 25 words or less $7.50, each additional word .29; all capitals leaded 25 words or less $9.00, each additional word .35. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

In industrial wrenches...



check the price tag— check the real cost, too!

Hand tools with the lowest price tag often are the most expensive. Before you buy, consider tool life, speed of delivery, vendor's tool knowledge, worker productivity. Consider tool quality and all it implies. For example, SNAP-ON® tools are made from specially selected alloy steels that provide toughness and durability—factors that permit lightweight design. A man can work faster, easier, get more done with these tools than with clumsy heavyweights.

Forging, machining and heat-treating operations are precision-controlled. A SNAP-ON wrench fits snugly, surely — lets a man pour on the muscle power with confidence. SNAP-ON tools cost less in the long run. They stay on the job long after price-line merchandise hits the junk heap.

Delivery speed is important, too, particularly on assembly line tools. SNAP-ON maintains fully stocked regional and branch warehouses throughout the U.S. and Canada. SNAP-ON customers get immediate attention on emergency calls.

Finally, you can't put a price tag on tool knowledge and experience. SNAP-ON sales engineers are qualified to give advice on proper tool selection, plan decentralized tool cribs, analyze tool needs for maintenance and overhaul. They also refer ideas on special tools to SNAP-ON design engineers.

By every tool measure, SNAP-ON gives you your money's worth — and then some. Your nearest SNAP-ON representative would welcome the opportunity to prove this. Call him or write us now for new 180-page industrial catalog.

FOR ALL INDUSTRY

SNAP-ON TOOLS

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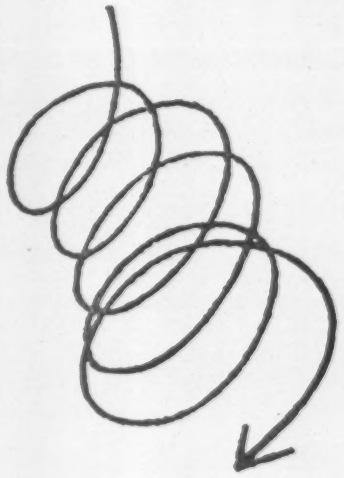

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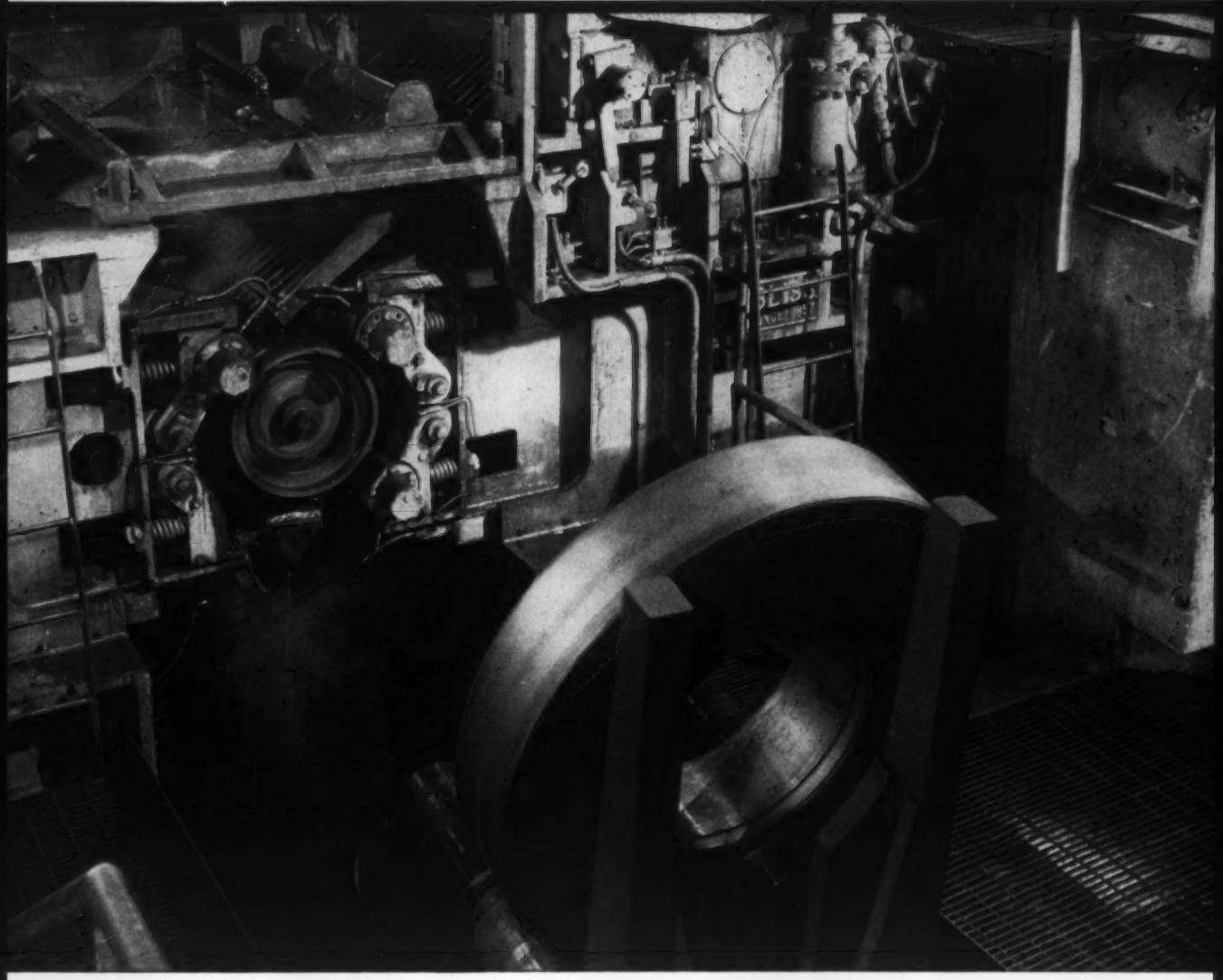

New downcoiler plays key role at Acme Steel's new hot strip mill

Among important Bliss mill auxiliaries selected by Acme Steel for the new hot strip mill at its Riverdale, Ill., plant, is the new downcoiler shown here. The coiler was designed with two objectives: simplicity and flexibility. Simplicity, by keeping the number of moving parts to a minimum for low maintenance costs and reduced downtime. Flexibility, by designing to permit the use of one, two, three or four blocker rolls without mechanical or electrical alterations.

Other units designed and built by Bliss' Rolling Mill Division include a combination depiler and furnace feeder, a furnace peeler, a crop shear and the side gauges at the end of the runout table just before the downcoiler.

Many of the most modern installations in the metal rolling industry carry the Bliss trade mark. For a portfolio of these mills and auxiliary rolling equipment, write us for a complimentary copy of our 84-page Rolling Mill Brochure, Bulletin 40-B.

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The driving force behind these developments is the Timken Company philosophy of *Service.* Not just institutional service to industry, but the kind of individual, on-the-spot bearing service that Timken Company sales engineers are qualified to give. They are able and eager to give on-the-spot professional assistance to help you build serviceable, reliable, salable machines.

This dynamic partnership with industry has enabled the Timken Company to become the world's largest manufacturer of tapered roller bearings with the enviable reputation of product excellence, pioneering of new applications and bearing industry leadership. It explains in part why Timken bearings are preferred by so many engineers.

An important share of every Timken bearing sales dollar is plowed back into improving research, testing and production facilities. This impatience with just "good enough" is why practically every major tapered roller bearing development has come from The Timken Roller Bearing Company. Invest more of your bearing dollars with the leader—it will repay you in improved products and money-savings—now and in the future.

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